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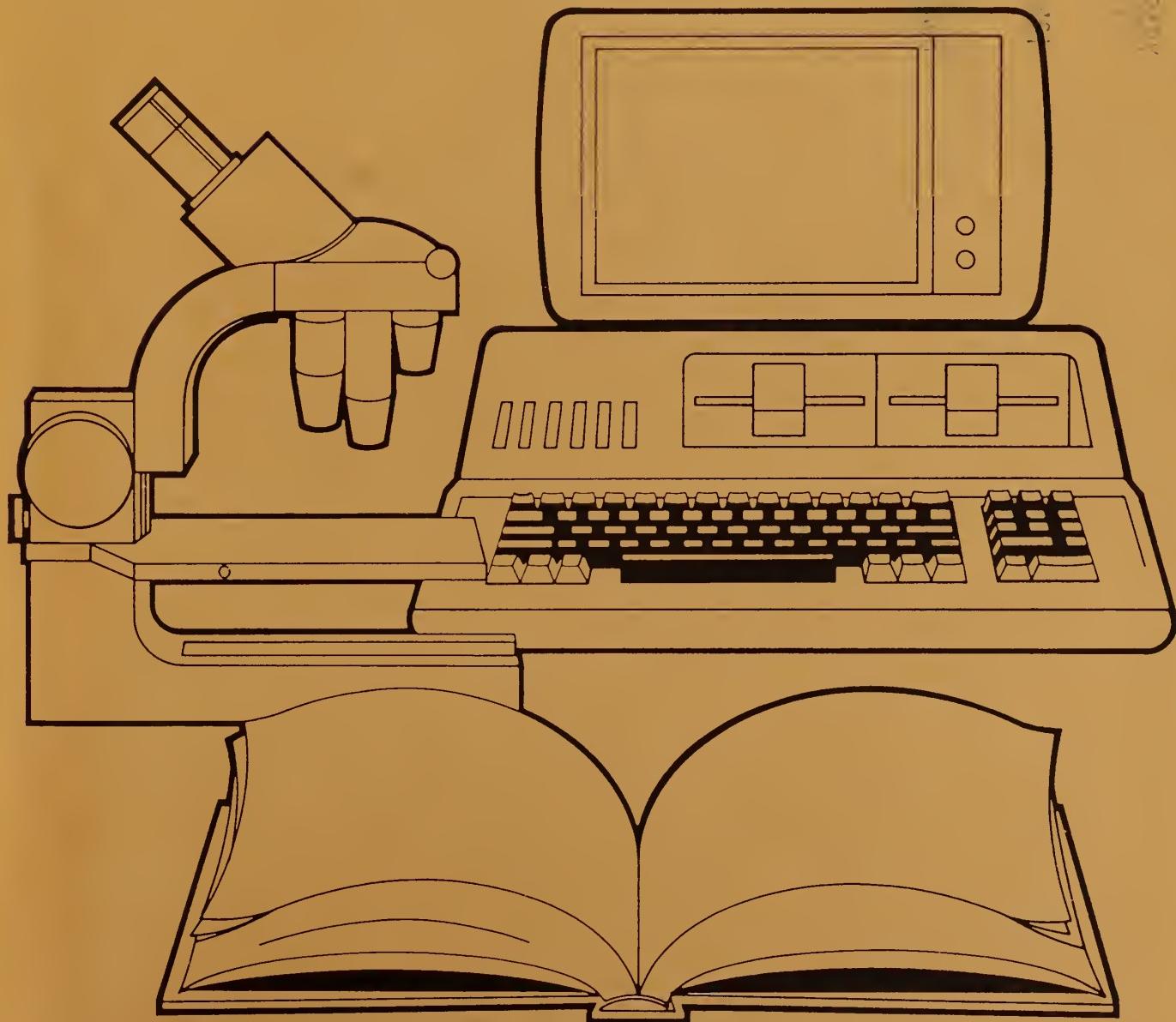
August 1991

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# The Protection of Stored Grains, 1979 - April 1991

Citations from AGRICOLA  
Concerning Diseases and Other  
Environmental Considerations





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August 1991

# The Protection of Stored Grains, 1979-April 1991

Citations from AGRICOLA  
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Compiled and Edited by  
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United States Department of Agriculture  
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United States Environmental Protection Agency  
Office of Pesticide Programs  
Washington, D.C. 20460

National Agricultural Library  
Beltsville, Maryland  
1991

**National Agricultural Library Cataloging Record:**

Bebbe, Charles N.

The protection of stored grains, 1979-April 1991 :  
citations from AGRICOLA concerning diseases and other  
environmental considerations.

(Bibliographies and literature of agriculture ; no. 108)

1. Grain—Storage—Diseases and injuries—Bibliography.  
I. Title.

aZ5076.A1U54 no.108

## FOREWORD

This is the 40th volume in a series of commodity-oriented environmental bibliographies resulting from a memorandum of understanding between the U.S. Department of Agriculture, National Agricultural Library (USDA-NAL), and the U.S. Environmental Protection Agency, Office of Pesticide Programs (EPA-OPP).

This close working relationship between the two agencies will produce a series of bibliographies which will be useful to EPA in the regulation of pesticides, as well as to any researcher in the field of plant or commodity protection. The broad scope of information contained in this series will benefit USDA, EPA, and the agricultural community as a whole.

The sources referenced in these bibliographies include the majority of the latest available information from U.S. publications involving commodity protection throughout the growing and processing stages for each agricultural commodity.

We welcome the opportunity to join this cooperative effort between USDA and EPA in support of the national agricultural community.

JOSEPH H. HOWARD, Director  
National Agricultural Library

DOUGLAS D. CAMPT, Director  
Office of Pesticide Programs



## INTRODUCTION

The citations in this bibliography, The Protection of Stored Grains, are selected from the AGRICOLA database concerning diseases and other environmental considerations from January 1979 to April 1991.

This is the 40th volume in a series of commodity-oriented listings of citations from AGRICOLA jointly sponsored by the U.S. Department of Agriculture, National Agricultural Library (USDA-NAL), and the U.S. Environmental Protection Agency, Office of Pesticide Programs (EPA-OPP). Additional volumes issued recently include The Protection of Tropical and Subtropical Fruits, The Protection of Small Grains, The Protection of Cucurbits, The Protection of Minor Vegetable Crops, The Protection of Peas, Beans, and Lentils, and The Protection of Forestry. The other 1991 volumes will cover The Protection of Lawn and Turf Grasses, The Protection of Nut Crops, The Protection of Tomatoes, Egg Plants, and Peppers, and The Protection of Peanuts.

Entries in the bibliography are subdivided into a series of section headings used in the contents of the Bibliography of Agriculture. Each item appears under every section heading assigned to the cited document. A personal author index and a site index to plants are included with each volume.

The U.S. Environmental Protection Agency contact for this project is Richard B. Peacock, Office of Pesticides and Toxic Substances.

Any comments or questions concerning this bibliography may be addressed to the compiler and editor:

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### Errata

6, 27, 100, 121, 130, 143, 224, 239, 280, 351, 372, 378, 424, 431, 473, 612,  
687, 695, 709, 735, 847, 856, 858, 897, 899, 901, 962, 1037, 1040, 1084,  
1091, 1136, 1182, 1246, 1258, 1272, 1282, 1335, 1344, 1354, 1387, 1409



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Stegelin, F.E. Hewitt, T.D. n.p., The Society. Proceedings - Soil and Crop Science Society of Florida. 1981. 1981. (40th). p. 144-146. Includes 4 ref. (NAL Call No.: 56.9 S032).

0051

### Feasibility of additional commercial rice storage (Costs).

Holder, S.H. Jr. Stennis, E.A. Mississippi State. M.A.F.E.S. research highlights. Mar 1979. v. 42 (3). p. 4,8. (NAL Call No.: 100 M69MI).

0052

### Fifty years of farmers' elevators in Iowa /by E.G. Nourse.

Nourse, Edwin Griswold, 1883-. Ames, Iowa : Agricultural Experiment Station, Iowa State College of Agriculture and Mechanic Arts, 1923. Caption title. p. 236-271 : ill., charts, maps ; 23 cm. (NAL Call No.: DNAL 100 Io9 no.211).

## (FARM ORGANIZATION AND MANAGEMENT)

0053

### Geometric and economic considerations in the design of flat storage systems.

Loewer, O.J. Berry, I.L.; Siebenmorgen, T.J. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1988 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1988. (fiche no. 88-6053). 26 p. ill. Includes references. (NAL Call No.: DNAL FICHE S-72).

0054

### Grain dust: problems and utilization.

Schnake, L.D. Washington, D.C., The Service. Abstract: Grain dust is a difficult, dangerous, and expensive material to handle. A country elevator handling 750,000 bushels of grain annually would spend an estimated \$500,000 for equipment to meet Clean Air Act standards. The additional cost of controlling dust may be offset by using the substance as fuel, feed, or fertilizer. Grain dust as a feed ingredient would likely be the optimum use. ESS - United States Dept. of Agriculture, Economics and Statistics Service. Apr 1981. Apr 1981. (6). 17 p. 28 ref. (NAL Call No.: aHD1751.U56).

0055

### Grain industry urges major revisions of proposed OSHA safety regulations.

CACBA. Minneapolis, Minn. : Cargill, Inc. Cargill bulletin. Aug 1984. p. 1, 6-7. (NAL Call No.: DNAL 281.8 C19).

0056

### Low temperature and solar drying facilities and new bin storage: investment, ownership, and energy costs for corn in 1982.

Schwart, R.B. Urbana, Ill. : The Service. Farm economics: facts and opinions - University of Illinois, Dept. of Agricultural Economics, Cooperative Extension Service. Sep 1982. Predominantly tables. Sep 1982. (82-12). 5 p. (NAL Call No.: 281.8 F2226).

0057

### Minnesota grain shipments 1981; a comparative look at corn, wheat, and soybeans for 1979 and 1981.

Eldridge, C. Fruin, J.; Alley, M. St. Paul : The Service. Extract: Extension bulletin - Agricultural Extension Service, University of Minnesota. May 1983. May 1983. (475). 43 p. maps, charts. maps, charts. (NAL Call No.: 275.29 M66S).

0058

### On-farm grain storage--does it pay? (Costs, statistics).

Figurski, D.L. McReynolds, K.L.; Frederick, A.L.; Pretzer, D.D. Manhattan, Kan., The Service. C - Kansas State University, Cooperative Extension Service. Sept 1979. Sept 1979. (610). 15 p. ill. (NAL Call No.: 275.29 K13EX).

0059

### On-farm rice drying and storage costs compared.

AKFRA. Evans, B. Wailes, E.J.; Holder, S.H. Fayetteville, Ark. : The Station. Arkansas farm research - Arkansas Agricultural Experiment Station. May/June 1985. v. 34 (3). p. 9. (NAL Call No.: DNAL 100 AR42F).

0060

### On-farm storage--a marketing alternative (Grain, Georgia, cost and potential returns, management).

Sprouse, W.T. Smith, L.W. Athens, Ga., The Service. Bulletin - Cooperative Extension Service, University of Georgia, College of Agriculture. May 1981. May 1981. (846). 15 p. 4 ref. (NAL Call No.: 275.29 G29B).

0061

### On-farm versus commercial wheat storage cost (Farm management, risks, Oklahoma).

Anderson, K. Page, R.E. Stillwater : The Service. OSU extension facts - Cooperative Extension Service, Oklahoma State University. June 1983. June 1983. (157). 2 p. (NAL Call No.: S544.3.0505).

0062

### OSHA's grain safety standards need refinement, (Occupational Safety and Health Administration).

Fehrenbach, D. Minneapolis, Minn. : Cargill, Inc. Cargill bulletin. May 1984. May 1984. p. 2. (NAL Call No.: 281.8 C19).

0063

### Production, consumption, and storage of Virginia corn and soybeans.

Kenyon, D.E. Mundy, K.P. Blacksburg, Va. : The University. Extract: Virginia does not produce sufficient corn and soybeans to meet feed demand by livestock and poultry within the state. The objectives of this study were to 1) determine the magnitude of the deficit, 2) determine if storage was aggravating the problem, and 3) determine why Virginia does not produce enough corn and soybeans to meet feed demand. Bulletin - Virginia Agricultural

## (FARM ORGANIZATION AND MANAGEMENT)

Experiment Station, Virginia Polytechnic Institute and State University. Apr 1983. (83-2). 66 p. Includes 12 references. (NAL Call No.: DNAL S541.5.V8B8).

0064

### **Recommendations for storing high moisture corn at the country elevator.**

Hill, L.D. Shove, G. Urbana, Ill. : The Department. A.E. - University of Illinois, Department of Agricultural Economics. Dec 1982. (4548). p. 51-55. (NAL Call No.: DNAL AGE 275.29 IL62P).

0065

### **The relationship of farmers' intentions to purchase and their actual purchases of metal bin grain storage.**

Dixon, B.L. Hill, L.D.; Saffell, M.S. Urbana, Ill., Illinois University. Dept. of Agricultural Economics. Extract: The first section of this article provides background information on grain storage practices, prior studies relevant to our topic, and the sample survey. From this information a limited dependent variable (Tobit) model of farmer behavior is hypothesized. In the second section, the estimates of the hypothesized model for explaining farmer behavior between March 1972 and April 1977 are analyzed. On the basis of this analysis, a simplified model is then estimated and used in the third section to forecast metal bin grain storage purchases for the period April 1977 to April 1982. North Central journal of agricultural economics. Jan 1980. v. 2 (1). p. 61-68. 9 ref. (NAL Call No.: HD1773.A3N6).

0066

**Returns to rice storage, 1972-81 (Costs and returns, net harvest prices, Arkansas).**  
Elam, E.W. AFKRA. Holder, S.H. Fayetteville : The Station. Arkansas farm research - Arkansas Agricultural Experiment Station. July/Aug 1983. v. 32 (4). p. 3. Includes references. (NAL Call No.: 100 AR42F).

0067

### **Solar-supplemented, natural air drying of shelled corn: the economic limitations.**

Heid, W.G. Jr. Aldis, D.F. Washington, D.C., The Department. Extract: It is not economically feasible to supplement natural air drying of high-moisture shelled corn by adding heat (solar and otherwise). In some cases, that drying method speeds product deterioration. A simulation analysis of the west central Great Plains determined that benefits from adding solar heat to batch-in-bin and layer-in-bin grain drying methods failed to offset the solar heat installation costs and product deterioration losses. Findings also suggest

that high-speed, high-temperature drying is necessary to avoid field losses and to ensure marketable corn of high quality. Technical bulletin - United States Dept. of Agriculture. June 1981. June 1981. (1654). 38 p. maps. 18 ref. (NAL Call No.: 1 AG84TE).

0068

### **Storage is where you find it.**

Mowitz, D. Finck, C. Des Moines, Iowa : Meredith Corp. Successful farming. Aug 1986. v. 84 (10). p. 11-17. ill. (NAL Call No.: DNAL 6 SU12).

0069

### **Using drought-stressed corn: harvesting, storage, feeding, pricing and marketing.**

Amaral, D. Crist, B.; Heersche, G.; Johns, J.; Olson, K.; Bitzer, M.; Benson, F.; Meyer, L.; Shurley, D. Lexington, Ky. : The Service. ID - University of Kentucky, Cooperative Extension Service. Aug 1988. (86). 7 p. ill. (NAL Call No.: DNAL S544.3.K4K42).

0070

### **What are the farmer's alternatives?**

Hill, L.D. Shove, G.C. Urbana, Ill. : The Department. A.E. - University of Illinois, Department of Agricultural Economics. Dec 1982. (4548). p. 19-24. (NAL Call No.: DNAL AGE 275.29 IL62P).

0071

### **What's the best moisture for corn and soybeans?**

Hill, L. Morrison, D.; Tuite, J. Urbana, Ill. : The Department. A.E. - University of Illinois, Department of Agricultural Economics. Dec 1982. (4548). p. 15-18. (NAL Call No.: DNAL AGE 275.29 IL62P).

0072

### **Who pays the piper with high moisture grain?**

Hill, L.D. Urbana, Ill. : The Department. A.E. - University of Illinois, Department of Agricultural Economics. Dec 1982. (4548). p. 9-14. (NAL Call No.: DNAL AGE 275.29 IL62P).

0073

### **1982 on-farm rice storage costs analyzed.**

Holder, S. Welch, W.; Wailes, E. Fayetteville, Ark. : The Station. Arkansas farm research - Arkansas Agricultural Experiment Station. Sept/Oct 1982. v. 31 (5). p. 4. (NAL Call No.: 100 AR42F).

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0074

**Agricultural subterminal storage facilities act of 1979 : hearing before the Subcommittee on Agricultural Credit and Rural Electrification of the Committee on Agriculture, Nutrition, and Forestry, United States Senate, Ninety-sixth Congress, first session, on S. 261 ... April 6, 1979.** -.

United States ~ Congress ~ Senate ~ Committee on Agriculture and Forestry. Washington U.S. Govt. Print. Off. 1979. iii, 81 p. : map ; 23 cm. (NAL Call No.: KF26.A3533 1979c).

0075

**Alternative wheat collection and transportation systems for the southern U.S. Plains.**

Fuller, S. Sorenson, O.; Johnson, M.; Oehrtman, R. College Station, Tex., Western Agricultural Economics Association. Extract: This study examines means of improving efficiency of the transportation portion of the export wheat handling system in the southern Plains. Analysis focuses on the feasibility of restructuring grain handling facilities to accommodate unit train movements to port locations. To accomplish this, a cost-minimizing network flow model was developed. Results show that the alternative transportation systems would have substantial effects on costs, wheat flow patterns and the economic viability of certain members of the grain handling and storage industry. Western journal of agricultural economics. July 1981. v. 6 (1). p. 91-101. 8 ref. (NAL Call No.: HD1750.W4).

0076

**An analysis of factors affecting the financial performance of country grain elevators.**

Burbrink, S.D. Boynton, R.D. West Lafayette, The Station. Extract: Analysis of variance and regression models were used to examine factors affecting the profitability of country grain elevators. One hundred twenty-four elevators in four states provided the data through personal interviews. Although cooperative elevators achieved significantly greater profitability than private elevators, the analysis revealed that the cooperatives' larger size and greater diversification were responsible for this superior performance. Station bulletin - Dept. of Agricultural Economics, Agricultural Experiment Station, Purdue University. May 1981. May 1981. (326). 34 p. 14 ref. (NAL Call No.: HD1775.I6I5).

0077

**An analysis of shipper leased rail equipment in North Dakota.**

Ming, D.R. Fargo, N.D. : Dept. of Agricultural Economics, North Dakota Agricultural Experiment Station. Extract: Rail car shortages throughout much of the 1970's particularly plagued the ability of country elevator managers to move

grain. In response to these problems, managers began to purchase and lease transportation equipment. The most popular alternative selected by North Dakota grain shippers was to lease jumbo covered hopper cars. The purpose of this report is to examine the use of leased and privately owned covered hopper cars by grain elevators in North Dakota. Agricultural economics report. Jan 1983. Jan 1983. (163). 67 p. (NAL Call No.: 281.9 N814A).

0078

**An assessment of the Mississippi River Gulf Port intermodal transportation and storage complex (Grain).**

Gauthier, W.M. Hader, G.R.; Traylor, H.D. Jefferson City, Mo., The Association. Official proceedings of the annual meeting - American Association of Feed Microscopists. 1980. 1980. (28th). p. 11-16. 9 ref. (NAL Call No.: 389.79 AM34).

0079

**Attitudes toward grain transportation among elevator managers / prepared for Pioneer Hi-Bred International, Inc. by Jefferson Davis Associates.** -.

Des Moines, Iowa Pioneer Hi-Bred International 1980. Cover title: Grain elevator managers' attitudes toward grain transportation; results of a poll of grain elevator managers in 16 states ~Includes index. xxiii, 145 leaves ; 28 cm. (NAL Call No.: S567.A8).

0080

**Bottleneck problems at Mississippi River Gulf Port grain export elevators.**

Gauthier, W.M. Traylor, H.D. Baton Rouge, The Department. Louisiana rural economist - Louisiana State University, Department of Agricultural Economics and Agribusiness. Nov 1978. v. 40 (4). p. 2-4. 1 ref. (NAL Call No.: 281.8 L93).

0081

**Breakage susceptibility of exported corn at origin and destination.**

Paulsen, M.R. Hill, L.D. St. Joseph, Mich., The Society. Extract: Corn samples from eleven shipments were collected by diverter samplers at an import elevator in England and at U.S. export elevators. Breakage susceptibility was measured with a centrifugal impacter and a Stein breakage tester and compared to the actual change in BCFM between origin and destination. Paper - American Society of Agricultural Engineers. Dec 2, 1980. Also identified as UILU-Eng 80-7017. Dec 2, 1980. (80-3533). 16 p. 10 ref. (NAL Call No.: 290.9 AM32P).

## (DISTRIBUTION AND MARKETING)

0082

### **Canada's bumper grain crops clog storage, transport facilities (Production).**

Browne, E. Washington. Foreign agricultureUnited States Foreign Agricultural Service. Mar 5, 1979. v. 17 (10). p. 5-6. (NAL Call No.: A281.9 F76F0).

0083

### **Canada's grain handling and transportation system.**

Normile, M.A. Washington, D.C. : The Service. Extract: Transportation problems have caused Canada to lose export sales, according to this status report of Canada's grain handling and transportation system. The study examines the causes of this decline and evaluates the system's capacity to handle larger volumes of grains and oilseeds. Recent changes in infrastructure and coordination of grain movement have improved the system's performance. Further improvements in the Canadian grain handling and transportation system's ability to meet world demand could cut U.S. grain export sales. Capacity will probably be adequate to move 30 million tons of export grain in 1985/86. Added investment will be required to ship 36 million tons in 1990/91. Foreign agricultural economic report - United States Dept. of Agriculture, Economic Research Service. Nov 1983. (192). 37 p. Includes 56 references. (NAL Call No.: DNAL A281.9 AG8F).

0084

**Changes in the quality of corn and soybeans between ports in the United States and England.**  
Hill, L.D. Paulsen, M.R.; Mounts, T.L.; Heakin, A.J.; List, G.R. Urbana, Ill., The Department. Extract: Origin and destination samples of corn and soybeans exported from the United States to England were compared on their physical and chemical properties to determine the change in quality between the issuance of a grade certificate and unloading at the export elevator. Federal Grain Inspection Service, USDA, provided samples for vessels sampled in England through a diverter type mechanical sampler during unloading. Analysis by USDA and University of Illinois laboratories established a reduction of one to three grades in the quality of corn and one to two grades in soybeans always on the factor of broken grains recorded as FM or BCFM. There were no significant changes between origin and destination in weed seeds, other grains, or grain by-products for either corn or soybean shipments. A.E. - University of Illinois, Department of Agricultural Economics. Oct 1981. Oct 1981. (4518). 42 p. 13 ref. (NAL Call No.: 275.29 IL62P).

0085

### **Characteristics of grain elevators that contract with railroads.**

Hanson, S.D. Baumhover, S.B.; Baumele, C.P. Ames, Iowa : American Agricultural Economics Association. The Staggers Rail Act of 1980 allowed contracts between railroads and shippers which have resulted in increased grain prices to some farmers while, at the same time, increasing competitive pressure on some local grain elevators. This study employs a logistic model designed for complex survey designs to identify characteristics of elevators that had railroad contracts during 1983-85. The total volume shipped from an elevator, number of railroads serving an elevator location, and affiliation with elevator firms serviced by more than one railroad company are found to contribute significantly to the probability of a grain elevator receiving a railroad contract. American journal of agricultural economics. Nov 1990. v. 72 (4). p. 1041-1046. Includes references. (NAL Call No.: DNAL 280.8 J822).

0086

### **Contracting rail freight services for country elevators in the Texas Panhandle.**

TAEBA. Fuller, S. College Station, Tex. : The Station. Bulletin B - Texas Agricultural Experiment Station. June 1984. (B-1473). 14 p. Includes 8 references. (NAL Call No.: DNAL 100 T31S (1)).

0087

### **Contracting with local elevators.**

Shumaker, G.A. Blacksburg, Va. : Extension Division, Virginia Polytechnic Institute and State University. Publication - Virginia Cooperative Extension Service. 1988. (448-032). p. 98-102. (NAL Call No.: DNAL S544.3.V8V52).

0088

### **Corn marketing, processing, and utilization.**

AGRYA. Watson, S.A. Madison, Wis. : American Society of Agronomy. Agronomy. In the series analytic: Corn and Corn Improvement, Third Edition / edited by G.F. Sprague and J.W. Dudley. 1988. (18). p. 881-940. Includes references. (NAL Call No.: DNAL 4 AM392).

0089

### **Cost of storing, handling, merchandising grain at Ohio country elevators / John W. Sharp.**

Sharp, John W., 1917-. Wooster, Ohio : Ohio Agricultural Experiment Station, 1963. Cover title. 15, 1 p. ; 23 cm. (NAL Call No.: DNAL 100 Oh3R no. 124).

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0090

### Costs and returns associated with on-farm storage of corn, wheat and soybeans.

Skees, J. Davis, J.T.; Brannon, R.H.; Loewer, O.J.; Shuffett, D.M. Lexington, The Station. Research report - University of Kentucky, Dept. of Agricultural Economics, Agricultural Experiment Station. Aug 1978. Aug 1978. (30). 42 p. 16 ref. (NAL Call No.: 917101(AGE)).

import regions. Three time periods and three different crops are also defined in the model. Agricultural economics report. Oct 1982. Oct 1982. (164). 50 p. Includes 25 references. (NAL Call No.: 281.9 N814A).

0091

### Country elevators shift services to fit the needs of farmers.

Woolverton, M.W. Zulauf, C.R.; Foltz, J.C. Columbus, The Department. Extract: This paper examines the impact on country elevators of the changes in production agriculture. While only Ohio country elevators were included in the study, the results should be applicable to other areas of the Corn Belt. Occasional paper - Ohio State University, Dept. of Agricultural Economics and Rural Sociology, Cooperative Extension Service. Aug 1981. Aug 1981. (ESO 853). 7 p. 8 ref. (NAL Call No.: HD1411.03).

0095

### An economic analysis of U.S. grain marketing and transportation system.

Koo, W.W. Thompson, S. Fargo : The Station. Extract: The purpose of this study is to optimize the U.S. grain distribution system under the institutional constraints imposed by both the agriculture and transportation sectors. The method used in this study is a spatial equilibrium model based on a mathematical programming algorithm. The model incorporates transportation and storage activities in marketing grain from producing regions to market destinations in the United States. North Dakota research report - North Dakota Agricultural Experiment Station. June 1982. June 1982. (89). 43 p. Includes 29 references. (NAL Call No.: 100 N813R).

0092

### Drying and storage requirements for Illinois grain during 1979 harvest.

Hill, L. Kling, K.; Lazarus, S. Urbana, The Department. A.E. - Illinois University, Dept. of Agricultural Economics. Sept 7, 1979. Sept 7, 1979. (AE-4482). 4 p. (NAL Call No.: 275.29 IL62P).

0096

### Economic effect of rural road development on grain assembly costs: the case of Lenawee County, Michigan.

Tucker, J.D. Thompson, S.R. East Lansing, The Department. Extract: This study explores one component of the agricultural marketing system, the movement of grain between agricultural producers and intermediate and final collecting points at grain elevators. The primary objective of this research is to investigate a localized rural transportation system within the State of Michigan in order to assess the economic impact of improving or developing the rural road infrastructure. It is the aim of this research to test the hypothesis that improving the rural road network will have a significant economic impact on the cost of grain assembly. Agricultural economics report - Michigan State University, Department of Agricultural Economics. Dec 1979. Dec 1979. (367). 60 p. maps. Includes ref. (NAL Call No.: 281.9 M5842).

0093

### Dust control for truck and rail receiving (Grain facilities).

Winsett, W.G. Washington, D.C. : National Grain & Feed Association, c1981. Dust control for grain elevators : comprehensive illustrated papers presented at the Grain Dust Control Seminar, May 7-8, 1981, St. Louis, Missouri / (ed. R.C. Gordon). p. 31-63. ill. (NAL Call No.: TH7697.G67G7 1981).

0097

### Effects of rail abandonment on grain marketing and transportation costs in central and southwestern Ohio.

Larson, D.W. Kane, M.D. Urbana, Ill., Illinois University. Dept. of Agricultural Economics. Extract: The possible effect of rail line abandonment upon grain marketing and transportation costs in a thirty-one-county area of central and southwestern Ohio is examined through network modeling and analysis with the Fulkerston Out-of-Kilter Algorithm. The Ohio Grain Rail Abandonment Model (OGRAM), used to evaluate the corn, soybean, and wheat transportation problem, contains farm and elevator storage and drying activities.

0094

### Economic analysis of domestic and ocean transportation for U.S. grain shipments.

Koo, W.W. Fargo, N.D. : Dept. of Agricultural Economics, North Dakota Agricultural Experiment Station. Extract: This study evaluates the interdependency between domestic and ocean transportation systems with changes in ocean freight rates and identifies impacts of the existing port capacity on the domestic and ocean shipments of grain. The method used for this study is a mathematical programming model based on a linear programming algorithm. The model has 88 producing regions, 24 domestic consuming regions, 13 export ports, 9 commercial storage locations, and 11 foreign

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elevator receiving and load-out activities, truck, rail, and barge transportation activities. North Central Journal of Agricultural Economics. July 1979. v. 1 (2). p. 105-113. 19 ref. (NAL Call No.: HD1773.A3N6).

0098

**Evaluating transportation management alternatives: guidelines for grain producers and shippers.**

Bahn, H.M. Lutgen, L.; Turner, M.S. Bozeman, Mont. : Montana State University, Cooperative Extension Service. Extract: Since there are no real substitutes for transportation, changes in the structure of the transportation industry will greatly affect agriculture. Grain farmers and shippers have little choice but to become aware of transportation changes as they take place, evaluate their effects and make logical decisions about how to deal with them. It is to that end that the Great Plains Task Force on Transportation of Agricultural Products prepared this publication. It is directed primarily toward grain producers and grain elevator operators throughout the Great Plains. Publication - Great Plains Agricultural Council. Mar 1983. Mar 1983. (105). p. 1-8. (NAL Call No.: S27.A3).

0099

**An expected utility model of grain storage and hedging by farmers.**

Hildreth, C. St. Paul, The Station. Technical bulletin. Minnesota. Agricultural Experiment Station. 1979. 1979. (321). 15 p. ill. 10 ref. (NAL Call No.: 100 M66 (3)).

0100

**A flexible rail rate policy: impacts on U.S. feed grains.**

XATBA. Hoffman, L. Hill, L.; Leath, M.N. Washington, D.C. : The Department. Extract: U.S. feed grains could be transported more efficiently by railroads through implementation of a combined peak and off-peak rail rate structure. This study assumes this policy had been in effect during a representative crop year and determines that a 5- to 15-percent change in rail rates would increase rail revenues and volume, reduce seasonal variation of rail demand, and create incentives for producers to store feed grain at county locations and ship at a later date. However, increased costs for storage, transportation, and handling would weaken the overall financial stability of the feed grain market. Technical bulletin - United States Dept. of Agriculture. Available from NTIS, order no. PB85-195576/AS.~ Includes statistical data. Apr 1985. (1701). 34 p. Includes 50 references. (NAL Call No.: DNAL 1 AG84TE).

0101

**Grain drying and storage facilities and marketing patterns in Illinois and Iowa.**

Hill, L.D. Vercimak, J.E. Urbana, Ill., The Station. AERR - Department of Agricultural Economics, University of Illinois Agricultural Experiment Station. Oct 1979. Oct 1979. (164). 18 p. (NAL Call No.: 281.9 IL62).

0102

**Grain dust: problems and utilization.**

Schnake, L.D. Washington, D.C., The Service. Abstract: Grain dust is a difficult, dangerous, and expensive material to handle. A country elevator handling 750,000 bushels of grain annually would spend an estimated \$500,000 for equipment to meet Clean Air Act standards. The additional cost of controlling dust may be offset by using the substance as fuel, feed, or fertilizer. Grain dust as a feed ingredient would likely be the optimum use. ESS - United States Dept. of Agriculture, Economics and Statistics Service. Apr 1981. Apr 1981. (6). 17 p. 28 ref. (NAL Call No.: aHD1751.U56).

0103

**Grain exporting economics port elevator cost simulations / Magid A. Dagher, Bruce J. Reynolds, Lynn W. Robins .**

Dagher, Magid A. Reynolds, Bruce J.; Robbins, Lynn W. Washington, D.C. : U.S. Dept. of Agriculture, Agricultural Cooperative Service, 1986. "November 1986"- p. 2 of cover. v, 14 p. : ill. ; 28 cm. Bibliography: p. 14. (NAL Call No.: DNAL aHD1491.A1U542 no.56).

0104

**Grain flows and selected characteristics of grain handling firms in Louisiana.**

Traylor, H.D. Musick, J.A.; Santamara, D. Baton Rouge, La. : The Station. Extract: The major objective of the study on which this report is based was to determine flow patterns and estimate quantities of grains handled by firms in Louisiana. Specific objectives were: 1) To identify changes in the numbers of grain handling firms by type of firm during the period 1970 through 1977; 2) To describe selected characteristics of commercial grain handling facilities in 1977; 3) To identify grain flows and marketing facilities handling grain in 1977, and 4) To determine quantities and origins of grains shipped by mode of transportation by both domestic and export grain handling firms. D.A.E. research report - Department of Agricultural Economics and Agribusiness, Louisiana State University, Louisiana Agricultural Experiment Station. Sept 1983. Sept 1983. (619). 38 p. Includes references. (NAL Call No.: 100 L935).

# (DISTRIBUTION AND MARKETING)

0105

## Grain flows in Florida - 1977.

Scarborough, G. Gainesville, Fla., The Department. Extract: This publication describes the types and locations of grain marketing firms in the state of Florida, the transportation-related characteristics of these firms, and the grain that was received and shipped by them for calendar year 1977. Staff paper - University of Florida, Food and Resource Economics Department. Oct 1979. Oct 1979. (139). 14 p. (NAL Call No.: 917032(AGE)).

0106

## In-transit shipboard fumigation of grain: research to regulation.

CFWOD. Davis, R. Barrett, R.H. St. Paul, Minn. : American Association of Cereal Chemists. Cereal foods world. Mar 1986. v. 31 (3). p. 227-229. ill. Includes 11 references. (NAL Call No.: DNAL 59.8 C333).

0107

## Louisiana commercial bulk grain handling facilities.

Clark, N.C. Robertson, D.R. Baton Rouge, La., The Station. Extract: There were 254 commercial bulk grain handling firms operating in Louisiana in February 1981. This report classifies these operations by type, location, and storage capacity as well as the facility manager's name and office telephone number. A.E.A. information series - Louisiana Agricultural Experiment Station. Apr 1981. Predominantly tables. Apr 1981. (50). 36 p. maps. 6 ref. (NAL Call No.: S67.E2).

0108

## On-farm storage--a marketing alternative (Grain, Georgia, cost and potential returns, management).

Sprouse, W.T. Smith, L.W. Athens, Ga., The Service. Bulletin - Cooperative Extension Service, University of Georgia, College of Agriculture. May 1981. May 1981. (846). 15 p. 4 ref. (NAL Call No.: 275.29 G29B).

0109

## Options for elevators.

Turner, M.S. Bozeman, Mont. : Montana State University, Cooperative Extension Service. Publication - Great Plains Agricultural Council. Mar 1983. Mar 1983. (105). p. 17-33. (NAL Call No.: S27.A3).

0110

## Posts on the Texas Gulf Coast--economic importance and role for Texas and U.S. grain crops.

Johnson, E.M.TAEBA. Fuller, S. College Station : The Station. Extract: Texas Gulf grain ports are an important outlet for the U.S. grain and soybean exports. Historically, Texas Gulf ports have been responsible for approximately 23 percent of the outflow of wheat, corn, grain sorghum, and soybeans, i.e., nearly one out of every four bushels of these commodities has been exported from the United States by way of Texas ports. Analysis indicates that nearly one-half of Texas' 1977 sorghum and soybean production and nearly two-thirds of the States' wheat production were marketed through Texas Gulf ports. Other states marketing a significant portion of a particular grain type via this outlet were Kansas, Oklahoma, Nebraska, and Missouri. Bulletin B - Texas Agricultural Experiment Station. June 1980. June 1980. (B-1268). 36 p. Includes 8 references. (NAL Call No.: 100 T31S (1)).

0111

## Production, utilization, and marketing patterns for Illinois grains and soybeans.

Hill, L.D. Brophy, J.P.; Leath, M.N. Urbana, Ill. : The Department. AERR - University of Illinois, Department of Agricultural Economics. Includes statistical data. June 1984. (196). 53 p. Includes 5 references. (NAL Call No.: DNAL 281.9 IL62).

0112

## Public stocks of grain and the market for grain storage (Supply and demand, price stabilization, econometric models).

Gardner, B. New York : North-Holland, c1982. New directions in econometric modeling and forecasting in U.S. agriculture / editor, G.C. Rausser. p. 443-469. Includes references. (NAL Call No.: HD1755.N48).

0113

## Rail transportation in the grain market: an overview.

Myles, A. Allen, A.J. Mississippi State : The Station. Extract: The primary objective of this study was to provide information on grain transported by rail carriers. The secondary objective was to provide information to aid grain producers, input suppliers, transportation related industries, grain marketing firms, public officials, researchers, and other interested parties in planning and developing alternative actions. Agricultural Economics Research Report - Mississippi Agricultural and Forestry Experiment Station. May 1984. May 1984. (148). 51 p. Includes 16 references. (NAL Call No.: 100 M69MR).

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0114

**Recent developments in the American grain storage industry.**

Fornari, H.D. Berkeley, University of California Press. Agricultural history. Jan 1982. v. 56 (1). p. 264-271. Includes ref. (NAL Call No.: 30.98 AG8).

0115

**The regulation of grain warehousing and its economic effects: the competitive position of Chicago in the 1870s and 1880s (State laws regarding storage and transportation of grain).**

Ulen, T.S. Berkeley, University of California Press. Agricultural history. Jan 1982. Includes comments by J. Lurie, pages 211-214. v. 56 (1). p. 194-210, 211-214. Includes ref. (NAL Call No.: 30.98 AG8).

0116

**Returns to rice storage, 1972-81 (Costs and returns, net harvest prices, Arkansas).**

Elam, E.W. AFKRA. Holder, S.H. Fayetteville : The Station. Arkansas farm research - Arkansas Agricultural Experiment Station. July/Aug 1983. v. 32 (4). p. 3. Includes references. (NAL Call No.: 100 AR42F).

0117

**Should you sell or store at harvest? (On-farm storage, grain).**

Coffman, R. Cedar Falls, Iowa, Professional Farmers of America, Inc. Management monthly. Aug 1981. v. 5 (8). p. 4. (NAL Call No.: S560.F28).

0118

**Typical price discount schedule, official USDA grade standards and moisture conversion table for soybeans.**

Swearingin, M. L. Polizotto, K. R.; Southard, C. B. & Agronomy guide. 1979. The purpose of this publication is to help people who may want to know the typical scale of price discounts currently used by Indiana elevators, the USDA official grade standards and the moisture conversion table for soybean storage.

Definitions and tables are incorporated. Document available from: Mailing Room, Ag Administration Bldg., Purdue Univ., West Lafayette, IN. 47907. 1 sheet. (NAL Call No.: AY-224).

0119

**U.S. wheat-marketing system: an insect ecosystem.**

Hagstrum, D.W. Heid, W.G. Jr. College Park, Md. : The Society. Bulletin of the Entomological Society of America. Spring 1988. v. 34 (1). p. 33-36. Includes references. (NAL Call No.: DNAL 423.9 EN8).

0120

**Who pays the piper with high moisture grain?**

Hill, L.D. Urbana, Ill. : The Department. A.E. - University of Illinois, Department of Agricultural Economics. Dec 1982. (4548). p. 9-14. (NAL Call No.: DNAL AGE 275.29 IL62P).

0121

**Why have some farmers opposed futures markets?**

JLPEA. Pashigian, B.P. Chicago, Ill. : University of Chicago Press. Journal of political economy. Apr 1988. v. 96 (2). p. 371-382. Includes references. (NAL Call No.: DNAL 280.8 J82).

# GRADING, STANDARDS, LABELLING

0122

The attitudes of farmers and country elevator managers toward present and proposed grain standards / Phillip Pepper and Lowell D. Hill --.

Pepper, Phillip. Hill, Lowell D. Urbana-Champaign : Dept. of Agricultural Economics, Agricultural Experiment Station, University of Illinois at Urbana-Champaign, 1977. Cover title.~ "June, 1977.". 16 p. ; 28 cm. --. (NAL Call No.: DNAL 281.9 IL62 no.151).

0123

**Breakage susceptibility of exported corn at origin and destination.**

Paulsen, M.R. Hill, L.D. St. Joseph, Mich., The Society. Extract: Corn samples from eleven shipments were collected by diverter samplers at an import elevator in England and at U.S. export elevators. Breakage susceptibility was measured with a centrifugal impacter and a Stein breakage tester and compared to the actual change in BCFM between origin and destination. Paper - American Society of Agricultural Engineers. Dec 2, 1980. Also identified as UILU-Eng 80-7017. Dec 2, 1980. (80-3533). 16 p. 10 ref. (NAL Call No.: 290.9 AM32P).

0124

**Changes in the quality of corn and soybeans between ports in the United States and England.**  
Hill, L.D. Paulsen, M.R.; Mounts, T.L.; Heakin, A.J.; List, G.R. Urbana, Ill., The Department. Extract: Origin and destination samples of corn and soybeans exported from the United States to England were compared on their physical and chemical properties to determine the change in quality between the issuance of a grade certificate and unloading at the export elevator. Federal Grain Inspection Service, USDA, provided samples for vessels sampled in England through a diverter type mechanical sampler during unloading. Analysis by USDA and University of Illinois laboratories established a reduction of one to three grades in the quality of corn and one to two grades in soybeans always on the factor of broken grains recorded as FM or BCFM. There were no significant changes between origin and destination in weed seeds, other grains, or grain by-products for either corn or soybean shipments. A.E. - University of Illinois, Department of Agricultural Economics. Oct 1981. Oct 1981. (4518). 42 p. 13 ref. (NAL Call No.: 275.29 IL62P).

0125

**Control of storage diseases of grain.**  
Tuite, J. Foster, G.H. Palo Alto, Annual Reviews. Annual review of phytopathology. 1979. v. 17. p. 343-366. ill. 160 ref. (NAL Call No.: 464.8 AN72).

0126

**The elevator's stake in the grade standards.**  
Hill, L.D. Urbana, Ill. : The Department. A.E. - University of Illinois, Department of Agricultural Economics. Dec 1982. (4548). p. 69-75. (NAL Call No.: DNAL AGE 275.29 IL62P).

0127

**Grading and pricing practices of North Dakota country elevators for durum and hard red spring wheat / Steven P. Gunn, William W. Wilson. --.**  
Gunn, Steven P. Wilson, William W. Fargo, N.D. : Dept. of Agricultural Economics, North Dakota State University, 1986. Cover title.~ "January 1986.". iv, 59, 1 p. : ill., forms ; 28 cm. --. Bibliography: p. 60 . (NAL Call No.: DNAL 281.9 N814A no.206).

0128

**Grain quality and grading standards.**

Sauer, D.B. St. Paul, Minn. : APS Press, c1988. Soybean diseases of the north central region / edited by T.D. Wyllie and D.H. Scott. Paper presented at the North Central Region Soybean Disease Workshop, March 10-11, 1987, Indianapolis, Indiana. p. 32-38. (NAL Call No.: DNAL SB608.S7S78).

0129

**Moulds, toxins, and food.**

Moreau, Claude. New York Wiley 1979. Abstract: The abundance of moulds on food products, particularly on stored grain, and their importance in manufactured products is a cause for anxiety due to the danger of fungi to the consumer. The danger of mould damage is high in stored food products. Spoilage of fresh food can produce highly toxic compounds. Changes in meat production and animal feed has caused new problems in mold growth. Food-born molds, their conditions for growth, contamination of food, and contamination consequences are discussed. Information on mycotoxins, aflatoxins, clavatoxins, other aspergillatoxins, islanditoxicosis, diverse penicillium toxicoses, fusariotoxicoses, stachybotryotoxicoses, and other mycotoxicoses are included with discussion of their nature and toxicity. Treatment of poisoned animals, preventative detection, detoxification of molded foods, and food preservation is covered. 477 p. : ill. ; 24 cm. Bibliography: p. (320)-458. (NAL Call No.: QR201.F6M6 F&N B-2365).

0130

**Residues of lindane in stored cereals.**

Gupta, H.C.L. Pareek, B.L. Hapur, Foodgrain Technologists' Research Association of India. Bulletin of grain technology. Aug 1978. v. 16 (2). p. 132-134. ill. 7 ref. (NAL Call No.: TS2120.B8).

(GRADING, STANDARDS, LABELLING)

0131

**Standards for structures and material handling--benefits and needs.**

Johnson, L.R. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1986 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1986. (fiche no. 86-5532). 7 p. (NAL Call No.: DNAL FICHE S-72).

0132

**Stored grain bug rules changed.**

Kantuck, B. Brookings, S.D. : The Department. Field facts : soils, insects, diseases, weeds, crops - South Dakota State University, Cooperative Extension, Plant Science Department. Aug 27, 1987. v. 2 (20). p. 4. (NAL Call No.: DNAL S596.7.F44).

0133

**Studies on fermentation of sorghum silage during storage--effect of urea and molasses.**

Singh, A.P. Pandit, N.N. Amsterdam, Elsevier Scientific Pub. Co. Animal feed science and technology. Dec 1978. v. 3 (4). p. 299-307. ill. 25 ref. (NAL Call No.: SF95.A55).

0134

**Typical price discount schedule, moisture conversion trade & USDA Official Grade standards for soft red winter wheat.**

Polizotto, K. R. Swearingin, M. L.; Southard, C. B. & Agronomy guide. 1981. Typical elevator price discount schedules, moisture conversion tables & USDA official guide standards data have been compiled & are presented in this publication for information relative to wheat storage, marketing & processing. Document available from: Mailing Room Ag Administration Bldg., Purdue Univ., West Lafayette, IN. 47907. 4 p. (NAL Call No.: Ay 243.).

0135

**Typical price discount schedule, official USDA grade standards and moisture conversion table for soybeans.**

Swearingin, M. L. Polizotto, K. R.; Southard, C. B. & Agronomy guide. 1979. The purpose of this publication is to help people who may want to know the typical scale of price discounts currently used by Indiana elevators, the USDA official grade standards and the moisture conversion table for soybean storage. Definitions and tables are incorporated. Document available from: Mailing Room, Ag Administration Bldg., Purdue Univ., West

Lafayette, IN. 47907. 1 sheet. (NAL Call No.: AY-224).

0136

**USDA grade standards for food and farm products / USDA. -.**

United States ~ Dept. of Agriculture ~ Food Safety and Quality Service. Washington Govt. Print. Off. 1979. Abstract: U.S. Department of Agriculture grade standards, which are used in marketing farm products and as the basis for federal and state grading services and manufacturer and packer quality control, are listed. Standards cover cotton and cottonseed, general items, dairy products, fresh and processed fruits and vegetables, grain and related products, livestock and wool, meat, poultry and rabbits, eggs, and tobacco and naval stores. The name of the government agency to contact for information is provided for each category of standards. The name of the standard is followed by the last date of issue, revision, or amendment and reference number in the Code of Federal Regulation, Title 7. Instructions on obtaining institutional meat purchase specifications and a list of congressional acts are also provided. 18 p. --. (NAL Call No.: TX537.U56 1979 F&N C-2052).

# FARM

0137

**Canada's bumper grain crops clog storage,  
transport facilities (Production).**  
Browne, E. Washington. Foreign  
agricultureUnited States Foreign Agricultural  
Service. Mar 5, 1979. v. 17 (10). p. 5-6. (NAL  
Call No.: A281.9 F76FO).

0138

**An expected utility model of grain storage and  
hedging by farmers.**  
Hildreth, C. St. Paul, The Station. Technical  
bulletin.Mnnesota. Agricultural Experiment  
Station. 1979. 1979. (321). 15 p. ill. 10 ref.  
(NAL Call No.: 100 M66 (3)).

# PLANT PRODUCTION - GENERAL

0139

**Guide for batch-drying in a bin.**

Olson, E. A. Document available from:  
University of Nebraska-Lincoln, Dept. of  
Agricultural Communications, Lincoln, Nebraska  
68583 19--?. This publication specifies how  
in-storage bin drying can be used with  
supplemental heat to increase drying rates. 10  
p. : ill. (NAL Call No.: Document available  
from source.).(NAL Call No.: CC 196).

0140

**Supplement to a bibliography of topics related  
to the study of grain-dust fire and explosion  
with keyword indexes, November 1976 - May 1978.**  
Verkade, Mary. Bluhm, Delwyn. Morgantown, W.Va.  
National Institute for Occupational Safety and  
Health, Division of Safety Research 1978. 100  
p. --. (NAL Call No.: Z5074.G8V4 Suppl.).

0141

**Wheat production handbook (Includes culture,  
diseases and pests, harvesting, storage, cost  
and return planning, fertilizing).**  
Manhattan, Kan., The Service. C.Kansas State  
University. Cooperative Extension Service. July  
1978. July 1978. (529). 29 p. ill. 1 ref. (NAL  
Call No.: 275.29 K13EX).

0142

**Wheat varieties that put more grain in the bin.**  
Sept 1979. v. 94 (9). Progressive farmer for  
the West. Sept 1979. v. 94 (9). p. 32. ill.  
(NAL Call No.: 6 T311).

# PLANT PRODUCTION - HORTICULTURAL CROPS

0143

**Silos and ensilage ; Tests of varieties of corn  
for feeding values ; Examination of beets and  
other roots for sugar and feeding value.**

St. Anthony Park, Minn. : University of  
Minnesota, Experiment Station of the College of  
Agriculture, 1888. Cover title. 22 p. ; 23 cm.  
(NAL Call No.: DNAL 100 M66 no.2).

# PLANT PRODUCTION - FIELD CROPS

0144

AM32P)

## Aeration of stored grain.

Frus, Jack D. Document available from: Iowa State University, Publications Distribution, Printing & Publications Bldg., Ames, Iowa 50011 1979. This publication discusses grain bin aeration. Included topics are air flow, aeration equipment, operating conditions, controls, and procedure for determining equipment size. 7 p. : ill. (NAL Call No.: Document available from source.).(NAL Call No.: PM 407).

0145

**Allowable storage time of corn as affected by heat buildup, natural convection and aeration.**  
Brooker, D.B. Duggal, A.K. St. Joseph, Mich., The Society. Transactions of the ASAE - American Society of Agricultural Engineers. May/June 1982. v. 25 (3). p. 806-810. 6 ref. (NAL Call No.: 290.9 AM32T).

0146

**The attitudes of farmers and country elevator managers toward present and proposed grain standards / Phillip Pepper and Lowell D. Hill --.**

Pepper, Phillip. Hill, Lowell D. Urbana-Champaign : Dept. of Agricultural Economics, Agricultural Experiment Station, University of Illinois at Urbana-Champaign, 1977. Cover title.- "June, 1977.". 16 p. ; 28 cm. --. (NAL Call No.: DNAL 281.9 IL62 no.151).

0147

**Attitudes toward grain transportation among elevator managers / prepared for Pioneer Hi-Bred International, Inc. by Jefferson Davis Associates. -.**

Des Moines, Iowa Pioneer Hi-Bred International 1980. Cover title: Grain elevator managers' attitudes toward grain transportation; results of a poll of grain elevator managers in 16 states ~Includes index. xxiii, 145 leaves ; 28 cm. (NAL Call No.: S567.A8).

0148

## Breakage susceptibility of exported corn at origin and destination.

Paulsen, M.R. Hill, L.D. St. Joseph, Mich., The Society. Extract: Corn samples from eleven shipments were collected by diverter samplers at an import elevator in England and at U.S. export elevators. Breakage susceptibility was measured with a centrifugal impacter and a Stein breakage tester and compared to the actual change in BCFM between origin and destination. Paper - American Society of Agricultural Engineers. Dec 2, 1980. Also identified as UILU-Eng 80-7017. Dec 2, 1980. (80-3533). 16 p. 10 ref. (NAL Call No.: 290.9

0149

**The Cereal rusts /edited by William R. Bushnell and Alan P. Roelfs. --.**  
Bushnell, William R.; Roelfs, A. P. Orlando : Academic Press, c1984-1985. 2 v. : ill. ; 24 cm. Includes bibliographies and indexes. (NAL Call No.: DNAL SB741.R8C44).

0150

## The challenge of harvesting and drying grain sorghum.

Donald, J. Raleigh, Harvest. The Peanut farmer. June 1980. v. 16 (6). p. 14. (NAL Call No.: SB351.A1P3).

0151

**Changes in the quality of corn and soybeans between ports in the United States and England.**  
Hill, L.D. Paulsen, M.R.; Mounts, T.L.; Heakin, A.J.; List, G.R. Urbana, Ill., The Department. Extract: Origin and destination samples of corn and soybeans exported from the United States to England were compared on their physical and chemical properties to determine the change in quality between the issuance of a grade certificate and unloading at the export elevator. Federal Grain Inspection Service, USDA, provided samples for vessels sampled in England through a diverter type mechanical sampler during unloading. Analysis by USDA and University of Illinois laboratories established a reduction of one to three grades in the quality of corn and one to two grades in soybeans always on the factor of broken grains recorded as FM or BCFM. There were no significant changes between origin and destination in weed seeds, other grains, or grain by-products for either corn or soybean shipments. A.E. - University of Illinois, Department of Agricultural Economics. Oct 1981. Oct 1981. (4518). 42 p. 13 ref. (NAL Call No.: 275.29 IL62P).

0152

## Chemical controls /Bill F. Jones, Donald R. Johnson.

Jones, Bill F. Johnson, Donald R. Little Rock, Ark. : Cooperative Extension Service, University of Arkansas, 1984? . Abstract: This excerpted information about chemical treatment of on-farm stored grain is used in the Arkansas Pesticide Applicator Training Program. The use of rodenticides and insecticide and the equipment used for as well as the different methods of application are discussed and illustrated. Fumigation techniques are also described. Recommended dosage calibrations for all treatments are supplied. Life-threatening situations in grain storage bins are described and illustrated. Safety tips are emphasized.

# (PLANT PRODUCTION - FIELD CROPS)

Reprinted from the University of Kentucky publication, "Management of on-farm stored grain", section 5. p. 59-92 : ill. ; 28 cm. (NAL Call No.: DNAL SB190.J62).

0153

## Continuous corn silage (Compared with grain yields, high and low fertility).

Evans, S.D.MXMRA. St. Paul : The Station. Miscellaneous publication - University of Minnesota, Agricultural Experiment Station. 1983. 1983. (2 rev.). p. 96. (NAL Call No.: S1.M52).

0154

## Corncribs in history, folklife & architecture /Keith E. Roe.

Roe, Keith E. Ames : Iowa State University Press, 1988. Includes index. xi, 103 p. : ill. (some col.) ; 22 x 29 cm. Bibliography: p. 96-99. (NAL Call No.: DNAL TH4935.R64 1988).

0155

## Cost of storing, handling, merchandising grain at Ohio country elevators /John W. Sharp.

Sharp, John W., 1917-. Wooster, Ohio : Ohio Agricultural Experiment Station, 1963. Cover title. 15, 1 p. : 23 cm. (NAL Call No.: DNAL 100 Oh3R no.124).

0156

## Country elevators shift services to fit the needs of farmers.

Woolverton, M.W. Zulauf, C.R.; Foltz, J.C. Columbus, The Department. Extract: This paper examines the impact on country elevators of the changes in production agriculture. While only Ohio country elevators were included in the study, the results should be applicable to other areas of the Corn Belt. Occasional paper - Ohio State University, Dept. of Agricultural Economics and Rural Sociology, Cooperative Extension Service. Aug 1981. Aug 1981. (ESO 853). 7 p. 8 ref. (NAL Call No.: HD1411.03).

0157

## Current concepts in seed deterioration as applied to seed corn (*Zea mays L.*) of different quality.

Burris, J.S. Bdliya, P.M. Washington, D.C. : The Conference. Report of annual Corn and Sorghum Research Conference. 1987. (42). p. 107-125. Includes references. (NAL Call No.: DNAL 59.9 AM32).

0158

Drying and storage of agricultural crops / Carl W. Hall. -. Hall, Carl W. Westport, Conn. AVI Pub. Co. c1980. ix, 381 p. : ill. ; 23 cm. Includes bibliographies and index. (NAL Call No.: SB186.2.H34).

0159

## Drying and storage requirements for Illinois grain during 1979 harvest.

Hill, L. Kling, K.; Lazarus, S. Urbana, The Department. A.E. - Illinois University, Dept. of Agricultural Economics. Sept 7, 1979. Sept 7, 1979. (AE-4482). 4 p. (NAL Call No.: 275.29 IL62P).

0160

## The economics of the international stockholding of wheat / Daniel T. Morrow. -.

Morrow, Daniel T. Washington, D.C. International Food Policy Research Institute (1980). 45 p. ; 26 cm. --. Bibliography: p. 39-45. (NAL Call No.: HD9000.6.I54 no.18).

0161

## Effect of drying methods and initial moisture content on sorghum seed during storage.

Mahajan, R.B. Kulkarni, L. P.; Solanke, R.B. (s.l.) : Sorghum Improvement Conference of North America. Sorghum newsletter. 1982. v. 25. p. 54-55. (NAL Call No.: 59.8 S06).

0162

## Energy expenditures for drying and harvesting losses as influenced by harvesting capacity and weather (Corn, *Zea mays*).

Loewer, O.J. Bridges, T.C.; White, G.M.; Razor, R.B. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1982. Paper presented at the 1982 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1982. (fiche no. 82-3515). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

0163

## Energy management in grain drying.

Holmes, Elwyn S. 1981. The material presented here examines the drying practices being used for grain & suggests ways that grain producers might dry their crops more efficiently. Document available from: Distribution Center,

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Umberger Hall, Kansas State Univ., Manhattan, KS 66506. 5 p. (NAL Call No.: MF 576).

0164

**Final report to the North Central Regional Pesticide Impact Assessment Program on losses associated with insect infestation of farm stored shelled corn and wheat in Minnesota /by Alan V. Barak and Phillip K. Harein.**  
Barak, Alan V. Harein, Phillip K. St. Paul, Minn. : Agricultural Experiment Station, University of Minnesota, 1981. Cover title: Losses associated with insect infestation of farm stored shelled corn and wheat in Minnesota. ii, 94 p. : ill., map ; 28 cm. Bibliography: p. 93-94. (NAL Call No.: DNAL S1.M52 no.12).

0165

**Grain drying, handling, and storage handbook.**  
Ames, Iowa : Midwest Plan Service, 1987 i.e. 1988 . Cover title.~ Rev. ed. of: Planning grain-feed handling. 1st ed. c1974.~ "MWPS-13.". ii, 85 p. : ill. ; 28 cm. Includes bibliography and index. (NAL Call No.: DNAL SB189.7.G73 1988).

0166

**Grain dust problems and utilization /L.D. Schnake.**  
Schnake, L. D. Washington, D.C. : U.S. Dept. of Agriculture, Economics and Statistics Service ; Springfield, Va. : National Technical Information Service, distributor , 1981. "April 1981"--P. iii.~ Bibliography: p. 16-17.~ "ESS-6". v, 17 p. ; 27 cm. (NAL Call No.: DNAL aHD9004.E77 no.6).

0167

**Grain dust abstracts / compiled by Fang S. Lai.**  
Lai, Fang S. (Manhattan, Kan.?) U.S. Dept. of Agriculture, Science and Education Administration 1981. Issued April 1981 ~Includes index. 28 p. ; 22 cm. --. (NAL Call No.: az5076.A1U54 no.12).

0168

**Grain exporting economics port elevator cost simulations / Magid A. Dagher, Bruce J. Reynolds, Lynn W. Robbins .**  
Dagher, Magid A. Reynolds, Bruce J.; Robbins, Lynn W. Washington, D.C. : U.S. Dept. of Agriculture, Agricultural Cooperative Service, 1986. "November 1986" - p. 2 of cover. v, 14 p. : ill. ; 28 cm. Bibliography: p. 14. (NAL Call No.: DNAL aHD1491.A1U542 no.56).

0169

**Grain pesticidesAmerican Association of Cereal Chemists. --.**  
Washington, D.C.? : The Association, 1985. Title from container. 4 videocassettes (362 min.) : sd., col. ; 1/2 in. (NAL Call No.: DNAL Videocassette no.21).

0170

**Grain sorghum: harvesting, drying & storing.**  
Hammond, C. Athens, Ga. : The Service. Leaflet - Cooperative Extension Service, University of Georgia. Apr 1987. (257.rev.). 8 p. ill. (NAL Call No.: DNAL 275.29 G29L).

0171

**Harvesting and storage of sweet sorghum biomass in Florida.**  
Eiland, B.R. Clayton, J.E.; Bryan, W.L. Baton Rouge : The Society. Journal - American Society of Sugar Cane Technologists. Mar 1984. v. 3. p. 18-21. Includes references. (NAL Call No.: DNAL TP375.A54).

0172

**Harvesting and storage of sweet sorghum biomass (Kansas).**  
Posler, G.L. Hill, N.S. (Washington, D.C. : The Department, 1983?). 3rd annual Solar and Biomass Workshop, April 26-28, 1983, Holiday Inn, Atlanta Airport/North Atlanta, Georgia / co-sponsors United States Department of Agriculture ... (et al.). p. 132-134. (NAL Call No.: aTJ810.S6 1983).

0173

**How fine should corn and sorghum be chopped for ensiling.**  
Owen, Foster. Guyer, Paul Q. & Nebguide. 1981. This publication discusses silage with corn and sorghum being the most popular. Forage moisture, chop length, animal response, silo affects, and energy needed for fine chops are covered. Document available from: University of Nebraska-Lincoln, Dept. of Agricultural Communications, Lincoln, Nebraska 68583. 1 sheet. (NAL Call No.: Not available at NAL).(NAL Call No.: G81-568).

0174

**Kernel breakage and density of normal and opaque-2 maize grain as influenced by irrigation and nitrogen.**  
CRPSAY. Kniep, K.R. Mason, S.C. Madison, Wis. : Crop Science Society of America. Grain quality is important to farmers, grain elevators, millers, and domestic and foreign buyers. Excessive broken kernels can reduce the grade

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of grain, lower the selling price farmers receive, decrease production from dry and wet milling processes, reduce artificial drying efficiency, and increase potential dust hazards. However, little attention has been focused on the influence of production practices on grain quality. This study was conducted to determine whether irrigation and soil N levels would affect the quality of maize (*Zea mays L.*) grain. Two water regimes and five N fertilization levels ranging from zero to 360 kg ha<sup>-1</sup> were applied to two normal and two opaque-2 hybrids. The experimental site was a Sharpsburg silty clay loam (fine, montmorillonitic, mesic, Typic Argiudoll) near Mead, NE. Opaque-2 grain was 2.4 times more susceptible to breakage, and 8% lower in density than normal grain. Irrigation increased kernel breakage susceptibility (KBS) from 13.5 to 17.9, 3.2 to 3.8, and 5.4 to 7.3% in 1985, 1986, and 1987, respectively. Increasing soil N levels decreased KBS for all hybrids. Kernel density (KD) of opaque-2 grain was increased with irrigation but decreased with higher N levels. In contrast, KD of normal grain decreased with irrigation but increased with higher N levels. Average grain yields were 9.4, 7.3, and 5.5 Mg ha<sup>-1</sup>, with irrigation increasing yields 28, 9, and 27% over nonirrigation in 1985, 1986, and 1987, respectively. Normal hybrids averaged 5% greater yields than opaque-2 hybrids. Yield increased quadratically with N rate within each moisture regime in each year. Results indicate production practices influence KBS and KD as well as yield, and may become important considerations in the future. Crop science. Jan/Feb 1989. v. 29 (1). p. 158-163. Includes references. (NAL Call No.: DNAL 64.8 C883).

0175

**Legume forages with corn and cane for silage / H.E. Dvorachek ... et al.**  
Dvorachek, H. E. Fayetteville, Ark. : University of Arkansas, College of Agriculture, Agricultural Experiment Station, 1925. Cover title. 14 p. ; 23 cm. (NAL Call No.: DNAL 100 Ar42 no. 196).

0176

**Low-temperature corn drying in Iowa.**  
Van Fossen, Larry. Document available from: Iowa State University, Publications Distribution, Printing & Publications Bldg., Ames, Iowa 50011 1979. This publication discusses major points to consider when selecting and operating a low temperature corn drying system for Iowa conditions. When to harvest, final corn moisture content, operating a low-temperature drying bin, and handling excessively wet corn with a low temperature drying system are covered. 1 sheet : ill. (NAL Call No.: Document available from source.).(NAL Call No.: Pm-910).

0177

**Moisture content of corn in relation to relative humidity and temperature of the atmosphere.**

AGJOAT. Alberts, H.W. Madison, Wis. : American Society of Agronomy. The moisture absorbing capacity of corn varied with the relative humidity. The effect of temperature upon the moisture absorbing capacity of corn at relative humidities between 10% and 90% was negligible. Above 90% relative humidity, the moisture content of corn was greatest at the lowest temperature. Below 10% relative humidity the moisture content of corn was greatest at the lowest temperature. Since a rise in temperature increases the moisture absorbing capacity of the air, it is deemed advisable to apply artificial heat together with ventilation on cold winter days to maintain a low moisture content of corn in seed corn storage houses. Agronomy journal. Nov 1926. v. 18 (11). p. 1029-1034. (NAL Call No.: DNAL 4 AM34P).

0178

**Natural air corn drying (Swine feed).**

Pierce, R.O. Thompson, T.L.; Schulte, D.D. Bozeman, Mont. : Montana State University, Cooperative Extension Service. Publication - Great Plains Agricultural Council. Oct 1983. Oct 1983. (108). p. 161-162. ill. (NAL Call No.: S27.A3).

0179

**Nitrogen application, ethephon treatment and narrow rows impact on barley yields and silage fermentation.**

DiRienzo, D.B. Webb, K.E. Jr.; Brann, D.E.; Alley, M.M.; Overbeck, R.L. Blacksburg, Va. : The Station. Animal science research report - Virginia Polytechnic Institute and State University, Virginia Agricultural Experiment Station. 1985. (4). p. 14-17. (NAL Call No.: DNAL SF1.A54).

0180

**Potassium sorbate as a preservative for high moisture corn.**

Yasin, M. Hanna, M.A. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1984. Paper presented at the 1984 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1984. (fiche no. 84-3009). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

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0181

**Preservation of sorghum plant portions harvested at ten stages of maturity.**

Schake, L.M. Ellis, W.C.; Suarez, W.A.; Riggs, J.K. College Station, Tex., The Station. PR - Texas Agricultural Experiment Station. 1981. 1981. (3758/3830). p. 59-64. ill. 5 ref. (NAL Call No.: 100 T31P).

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Khompos, V. Segerlind, L.J.; Brook, R.C. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1984. Paper presented at the 1984 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1984. (fiche no. 84-3011). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

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**Sampling methods for determining insect population in stored grain /prepared by Stored-Product Insects Branch, Market Quality Research Division.**

Washington, D.C. : U.S. Dept. of Agriculture, Agricultural Marketing Service, 1963. Caption title. 2 p. ; 26 cm. (NAL Call No.: DNAL A280.39 M34Am no.497).

0184

**Selection and storage of seed corn /by W.L. Burlison and E.A. White.**

Burlison, W. L. 1882-. White, E. A.\_1883-. Urbana, Ill. : University of Illinois Agricultural Experiment Station, 1918. Cover title. 16 p. : ill. ; 23 cm. (NAL Call No.: DNAL 275.29 IL62C no.225).

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**Silos and ensilage ; Tests of varieties of corn for feeding values ; Examination of beets and other roots for sugar and feeding value.**

St. Anthony Park, Minn. : University of Minnesota, Experiment Station of the College of Agriculture, 1888. Cover title. 22 p. ; 23 cm. (NAL Call No.: DNAL 100 M66 no.2).

0186

**Small grain production in Michigan.**

Leep, R. H. Copeland, L. O. Document available from: Michigan State University, Bulletin Office, P.O.Box 231, East Lansing, Michigan 48824 1981. Discusses soil and climatic requirements; varieties; land preparation; fertilizer needs; planting management, weed, insect, and disease control; harvest; and storage for winter wheat, oats, and barley. 1 sheet : ill. (NAL Call No.: Document available from source.).(NAL Call No.: EB E-1522).

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**Solar heat for corn drying under Ohio conditions. II. Summer storage of solar heat.**

Misra, R.N. Keener, H.M.; Roller, W.L. St. Joseph, Mich., The Society. Transactions of the ASAE - American Society of Agricultural Engineers. Mar/Apr, 1982. v. 25 (2). p. 459-464. Includes 20 ref. (NAL Call No.: 290.9 AM32T).

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Christensen, Clyde M.; (Clyde Martin),; 1905-. St. Paul, Minn. American Association of Cereal Chemists 1982. Includes index. 544 p. ill. ; 24 cm. Includes bibliographies. (NAL Call No.: SB190.C43 1982).

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Eckhoff, S. Okos, M.R. Washington, D.C. : The Sulphur Institute. Sulphur in agriculture. 1984. v. 8. p. 17-21. ill. Includes references. (NAL Call No.: S587.5.S9S9).

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**Sweet sorghum production, harvesting, and storage in south Florida.**

Eiland, B.R. Clayton, J.E. (Washington, D.C. : The Department, 1983?). 3rd annual Solar and Biomass Workshop, April 26-28, 1983, Holiday Inn, Atlanta Airport/North Atlanta, Georgia / co-sponsors United States Department of Agriculture ... (et al.). p. 124-127. Includes

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references. (NAL Call No.: aTJ810.S6 1983).

0192

**Uses of sorghum grain** by Carleton R. Ball and Benton E. Rothgeb. --.  
Ball, Carleton, R. 1873-1958. Washington, D.C. : U.S. Dept. of Agriculture, 1915. 16 p. : ill.  
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**Using drought-stressed corn: harvesting, storage, feeding, pricing and marketing.**  
Amaral, D. Crist, B.; Heersche, G.; Johns, J.; Olson, K.; Bitzer, M.; Benson, F.; Meyer, L.; Shurley, D. Lexington, Ky. : The Service. ID - University of Kentucky, Cooperative Extension Service. Aug 1988. (86). 7 p. ill. (NAL Call No.: DNAL S544.3.K4K42).

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**1984 hybrid corn performance trials.**  
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0195

Breeding for host plant resistance to stored rice insects (*Sitophilus oryzae*, *Rhyzopertha dominica*).  
Cogburn, R.R. TX-AR-SO. Bollich, C.N. College Station, Tex., The Station, MP - Texas Agricultural Experiment Station. July 1980. July 1980. (1451). p. 355-358. 6 ref. (NAL Call No.: 100 T31M).

0196

Conservation and aerobic stability of forage and sweet sorghum silages treated with acrylic or caproic acid.  
AGUOAT. Hill, N.S. Posler, G.L.; Bolen, K.K.; Ware, G.O. Madison, Wis. : American Society of Agronomy. Agronomy Journal. July/Aug 1987. v. 79 (4). p. 615-618. Includes references. (NAL Call No.: DNAL 4 AM34P).

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Current concepts in seed deterioration as applied to seed corn (*Zea mays L.*) of different quality.  
Burris, J.S. Bdliya, P.M. Washington, D.C. : The Conference. Report of annual Corn and Sorghum Research Conference. 1987. (42). p. 107-125. Includes references. (NAL Call No.: DNAL 59.9 AM32).

0198

Effect of relative humidity and temperature on germination of seeds of two F1 sorghum hybrids and their parents during storage.  
Agrawal, P.K. USTED. Patil, R.B.; Dadlani, M.; Singh, D. East Lansing : Association of Official Seed Analysts. Journal of seed technology. 1981. v. 6 (3). p. 31-37. ill. Includes references. (NAL Call No.: SB113.2.J6).

0199

The effects of heat treatment and inoculum concentration on growth and sporulation of *Penicillium* spp. on corn genotypes in storage.  
PHYTA. Yao, B. Tuite, J. St. Paul, Minn. : American Phytopathological Society. The effects of heat treatment and inoculum concentration of *Penicillium brevi-compactum*, *P. cyclopium*, and *P. viridicatum*, on storability of corn kernels were determined in separate tests for 10 genotypes of dent corn and a visual flint (VF) selection. Hand-shelled corn grown during 1983-1985 was used. Kernels of B73 X Mo17 and Dekalb XL67, resistant, and H95 very susceptible and VF, moderately susceptible to storage Penicillia were heated at 80°C for 20 min, then inoculated with 2 X 10(3) spores/g and stored at 88% RH and 14°C for 49 days. Host reaction was determined by a visible mold rating on individual kernels and number or

propagules isolated after dilution on a modified potato-dextrose agar. Moldling was substantially increased by the heat treatment as measured by propagules and less so by visible mold for all four genotypes. Increase was greater for the resistant hybrids but the disease rankings among the genotypes remained. The heat-treated resistant hybrids did not support significantly more sporulation of *Penicillium* than the unheated, susceptible genotypes. In three tests, a total of 11 corn genotypes were inoculated with 2 X 10(3) to 10(4) or 2 X 10(3) to 10(5) spores of *Penicillium* spp. per gram of corn and stored at 13-14°C and 88% RH. Increasing the inoculum to either 10(4) or 10(5) spores/g generally had no significant effect on relative resistance as measured by propagules and visible mold, although there was an increase in propagules with an increase in the amount of inoculum, particularly when 2 X 10(4) or 10(5) spores/g was used. There appeared to be a more defined separation of hybrids with inoculum at 2 X 10(4) and 10(5) than at 2 x 10(3) spores/g. Phytopathology. Oct 1989. v. 79 (10). p. 1101-1104. Includes references. (NAL Call No.: DNAL 464.8 P56).

0200

Effects of whole corn kernels and extracts on behavior of maize weevil (Coleoptera: Curculionidae).  
JEENAI. Tipping, P.W. Mikolajczak, K.L.; Rodriguez, J.G.; Poneleit, C.G.; Legg, D.E. College Park, Md. : Entomological Society of America. Journal of economic entomology. Oct 1987. v. 80 (5). p. 1010-1013. Includes references. (NAL Call No.: DNAL 421 J822).

0201

Energy consumption and food utilization of the Indian meal moth (Lepidoptera: Pyralidae) on different corn genotypes.  
JKESA. Hockensmith, P.E. Devine, T.L.; Legg, D.E.; Rodriguez, J.G. Lawrence, Kan. : The Society. Journal of the Kansas Entomological Society. Oct 1986. v. 59 (4). p. 598-603. Includes references. (NAL Call No.: DNAL 420 K13).

0202

Factors contributing to resistance of exotic maize populations to maize weevil, *Sitophilus zeamais*.  
JCECD. Serratos, A. Arnason, J.T.; Nozzolillo, C.; Lambert, J.D.H.; Philogene, B.J.R.; Fulcher, G.; Davidson, K.; Peacock, L.; Atkinson, J.; Morand, P. New York, N.Y. : Plenum Press. Journal of chemical ecology. Apr 1987. v. 13 (4). p. 751-762. ill. Includes references. (NAL Call No.: DNAL QD415.A1J6).

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0203

**Factors that affect the relative resistance of rough rice to angoumois grain moths and lesser grain borers (*Sitotroga cerealella*, *Rhyzopertha dominica*).**

Cogburn, R.R. EVETB. Bollich, C.N.; Meola, S. College Park : Entomological Society of America. Environmental entomology. June 1983. v. 12 (3). p. 936-942. ill. Includes references. (NAL Call No.: QL461.E532).

0204

**Gene expression in seed development and germination.**

Bewley, J.D. Marcus, A. San Diego, Calif. : Academic Press. Progress in nucleic acid research and molecular biology. Literature review. 1990. v. 38. p. 165-193. Includes references. (NAL Call No.: DNAL 386 D282).

0205

**Genetic resistance in cereal grains to storage insects (Rice weevil *Sitophilus oryzae*).**  
Boles, H.P. Pomeranz, Y. Washington, D.C., The Administration. Agricultural reviews and manuals. ARM-W. United States. Dept. of Agriculture. Science and Education Administration. Western Region. Office of the Regional Administrator for Federal Research. Aug 1978. Aug 1978. (4). p. 180-190. ill. 22 ref. (NAL Call No.: AS21.A75U64).

0206

**Genotypic differences in reaction in stored corn kernels to attack by selected *Aspergillus* and *Penicillium* spp. (*Zea mays*, maize).**  
Cantone, F.A. PHYTA. Tuite, J.; Bauman, L.F.; Stroshine, R. St. Paul : American Phytopathological Society. Phytopathology. Sept 1983. v. 73 (9). p. 1250-1255. Includes references. (NAL Call No.: 464.8 P56).

0207

**Heritability of resistance to stored-product insects in three hybrid population of rice.**  
EVETEX. Cogburn, R.R. Bollich, C.N. Lanham, Md. : Entomological Society of America. Environmental entomology. Apr 1990. v. 19 (2). p. 268-273. Includes references. (NAL Call No.: DNAL QL461.E532).

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**History and operation of the National plant germplasm system.**

White, G.A. Shands, H.L.; Lovell, G.R. Portland, Or. : Timber Press. Plant breeding reviews. In the series analytic: The National Plant Germplasm System of the United States /

edited by J. Janick. 1989. v. 7. p. 5-56. ill. maps. Includes references. (NAL Call No.: DNAL SB123.P55).

0209

**Influence of mechanical damage and repeated infestation of sorghum on its resistance to *Sitophilus oryzae* (L.) (Coleoptera: Curculionidae) (Stored grain pests, sorghum cultivars).**

Williams, J.O. Mills, R.B. Oxford, Pergamon Press. Journal of stored products research. June 1980. v. 16 (2). p. 51-53. 5 ref. (NAL Call No.: 421 J829).

0210

**Inheritance of malathion resistance in a strain of *Tribolium castaneum* (Coleoptera: Tenebrionidae) and effects of resistance genotypes on fecundity and larval survival in malathion-treated wheat.**

JEENAI. White, N.D.G. Bell, R.J. Lanham, Md. : Entomological Society of America. Malathion resistance in a strain of *Tribolium castaneum* (Herbst) was found to be malathion specific, triphenyl phosphate suppressible, autosomal, monofactorial, and semidominant after 15 generations of selection on up to 600 ppm malathion in flour. Confirmation of inheritance patterns was determined by filter paper resistance tests and repeatedly backcrossing heterozygotes to susceptibles. On wheat treated with 0, 4, 8 ppm malathion, with or without ground wheat (dockage), progeny production on insecticide-treated wheat was greatest by homozygous resistant parents, whereas heterozygous parents were more productive than homozygous ones on untreated wheat. Different instars raised to adult on the same malathion-treated medium showed that the presence of dockage increased survival and that homozygous resistant larvae were much more resistant than heterozygotes. Mortality was greater in all larvae than in adults. At present, low frequency levels of malathion-resistant strains of *T. castaneum* in Canada, and immigration of susceptible adults raising the proportion of heterozygous or susceptible progeny, should minimize control failures with malathion. Journal of economic entomology. Feb 1988. v. 81 (1). p. 381-386. Includes references. (NAL Call No.: DNAL 421 J822).

0211

**Inheritance of resistance in whole kernel maize to oviposition by the maize weevil (Coleoptera: Curculionidae).**

JEENAI. Tipping, P.W. Cornelius, P.L.; Legg, D.E.; Poneleit, C.G.; Rodriguez, J.G. Lanham, Md. : Entomological Society of America.

Inheritance of resistance in maize, *Zea mays* L., to oviposition by the maize weevil, *Sitophilus zeamais* Motschulsky, was investigated by first crossing 10 inbred lines

(PLANT BREEDING)

(A619, B37, B68, B73, H95, M017, N28, Pa91, R805, and T220) in all possible combinations (full diallel) in two environments (Florida and Kentucky). Resulting F1 seed was evaluated for resistance to the maize weevil. Remnant F1 seed was then planted, and the F2 seed was evaluated for resistance as before. A significant environmental influence occurred on the expression of resistance; maize grown in Florida was consistently more susceptible to maize weevil attack than that grown in Kentucky. Generally, however, the most resistant genotypes in one environment were among the most resistant in the other. Other findings indicated that general combining ability and, to a lesser extent, specific combining ability were important in the heritability of resistance to the maize weevil. A significant maternal effect occurred on resistance in the F1 but it generally was not present in the F2 seed. Conclusions are that, using these genotypes, development of hybrids with significant maize weevil resistance should be possible because the resistance factors were principally influenced by general combining ability and maternal effects were not expressed past the F1 generation. Journal of economic entomology. Oct 1989. v. 82 (5). p. 1466-1469. Includes references. (NAL Call No.: DNAL 421 J822).

0212

**Occurrence of Aphelenchoides besseyi in Louisiana rice seed and its interaction with Sclerotium oryzae in selected cultivars.**  
JONEB. McGawley, E.C. Rush, M.C.; Hollis, J.P. Raleigh, N.C. : Society of Nematologists. Journal of nematology. Jan 1984. v. 16 (1). p. 65-68. Includes 9 references. (NAL Call No.: DNAL QL391.N4J62).

0213

**Principles, problems, progress and potential in host resistance to stored-grain insects.**  
Horber, E. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. Literature review. p. 391-417. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

0214

**Quantification of Aspergillus flavus growth on inoculated excised kernels of corn genotypes (*Zea mays*, resistance, aflatoxin control, hybrid evaluation).**  
Adams, N.J.AGUOAT. Scott, G.E.; King, S.B. Madison : American Society of Agronomy. Agronomy journal. Jan/Feb 1984. v. 76 (1). p. 98-102. ill. Includes references. (NAL Call No.: 4 AM34P).

0215

**Resistance of dent corn inbred lines to oviposition by the maize weevil.**  
JKESA. Tipping, P.W. Rodriguez, J.G.; Poneleit, C.G.; Legg, D.E. Lawrence, Kan. : The Society. Journal of the Kansas Entomological Society. Jan 1988. v. 61 (1). p. 131-134. Includes references. (NAL Call No.: DNAL 420 K13).

0216

**Resistance of pearl millet cultivars to *Sitophilus oryzae*, *Sitotroga cerealella*, and *Rhyzopertha dominica*.**  
JEENAI. Seifelnsar, Y.E. Mills, R.B. College Park, Md. : Entomological Society of America. Journal of economic entomology. Feb 1985. v. 78 (1). p. 181-184. Includes references. (NAL Call No.: DNAL 421 J822).

0217

**Resistance of sorghum varieties to *Sitophilus oryzae* and *Sitotroga cerealella*.**  
Fadelmula, A. Horber, E. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. p. 418-434. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

0218

**Resistance to the lesser grain borer in Dawn' and Labelle' varieties of rice.**  
JEENAI. McGaughey, W.H. College Park, Md. : Entomological Society of America. Journal of economic entomology. Aug 1973. v. 66 (4). p. 1005. Includes references. (NAL Call No.: DNAL 421 J822).

0219

**Wheat tetrameric inhibitors of insect alpha-amylases: alloplaid heterosis at the molecular level.**  
PNASA. Gomez, L. Sanchez-Monge, R.; Garcia-Olmedo, F.; Salcedo, G. Washington, D.C. : The Academy. Proceedings of the National Academy of Sciences of the United States of America. May 1989. v. 86 (9). p. 3242-3246. ill. Includes references. (NAL Call No.: DNAL 500 N21P).

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0220

1984 hybrid corn performance trials.  
OASPA. Burnett, C.R. Corvallis, Or. : The  
Station. Special report - Oregon State  
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0221

**Continuous corn silage (Compared with grain yields, high and low fertility).**  
Evans, S.D. XMRA. St. Paul : The Station.  
Miscellaneous publication - University of Minnesota, Agricultural Experiment Station.  
1983. 1983. (2 rev.). p. 96. (NAL Call No.: S1.M52).

0222

**Effect of moisture content on viability and infestation of hulless Terra oats in storage (Compared to a hulled cultivar).**  
Sinha, R.N. White, N.D.G. Ottawa, Agricultural Institute of Canada. Canadian journal of plant science. Oct 1979. v. 59 (4). p. 911-916. ill. 14 ref. (NAL Call No.: 450 C16).

0223

**Germination and growth of rice seedlings from high and low protein seeds after exposure to various storage conditions.**  
Bittenbender, H.C. Ries, S.K. East Lansing, Association of Official Seed Analysts. Journal of seed technology. 1977. v. 2 (1). p. 62-72. ill. 31 ref. (NAL Call No.: SB113.2.J6).

0224

**Loss of dry weight during washing and storage of root samples (Wheat).**  
Van Noordwijk, M. Floris, J. The Hague, Nijhoff. Plant and soil. Oct 1979. v. 53 (1/2). p. 239-243. ill. 4 ref. (NAL Call No.: 450 P696).

0225

**Storability of farm-stored hulless oats in Manitoba (Germination tests).**  
Sinha, R.N. Wallace, H.A.H. Ottawa, Agricultural Institute of Canada. Canadian journal of plant science. Oct 1979. v. 59 (4). p. 949-957. ill. 9 ref. (NAL Call No.: 450 C16).

# PLANT PHYSIOLOGY AND BIOCHEMISTRY

0226

Drying and NaF alter viability and soluble proteins of germinating wheat seeds.

JFBID. Lupano, C.E. Anon, M.C. Trumbull, Conn. : Food and Nutrition Press. Journal of food biochemistry. Aug 1990. v. 14 (4). p. 293-306. Includes references. (NAL Call No.: DNAL TX545.J6).

0227

Effect of hot water treatments on the quality of rice seed destined for international exchange.

CRPSAY. Ventura, A.R. Garrity, D.P. Madison, Wis. : Crop Science Society of America. Hot water treatment is used to control seedborne pathogens of rice (*Oryza sativa L.*) but it may adversely affect germination and seedling vigor. If cultivars differ in sensitivity to the hot water treatment used, performance in international cultivar trials may be confounded by the differential hot water effect. We tested alternative hot water treatments within the recommended range for plant quarantine to determine their effects on the viability, vigor, and longevity of seeds of four rice cultivars differing in thermal sensitivity. Factors tested included water temperature, length of immersion period, effect of presoaking the seed, and storage conditions after treatment. Hot water treatment at 52 degrees C for 15 min was physiologically safe for rice seed regardless of cultivar, storage condition after treatment, or whether presoaking was practiced before the treatment. The 52 degrees C/15-min treatment actually increased field seedling vigor and tiller number over the untreated control. The 52 degrees C/30-min treatment had significant deleterious effects on the germinability of two out of four cultivars after 45 days in storage. The 57 degrees C/15-min treatment produced deleterious effects when the seeds were presoaked and stored under tropical room conditions (25 to 32 degrees C/78% relative humidity). The 57 degrees C/30-min treatment consistently decreased seed quality in all tests and is considered an unsafe treatment for rice seed. Temperature, exposure period presoaking period, storage conditions, and length of storage interacted synergistically in their deleterious effects on rice seed. Safe treatments were defined in terms of all of these factors. Cultivar responses to the various hot water treatment combinations were generally similar. The most sensitive cultivar was japonica Nan Keng 32'. Crop science. Mar/Apr 1987. v. 27 (2). p. 278-283. Includes references. (NAL Call No.: DNAL 64.8 C883).

0228

Effects of whole corn kernels and extracts on behavior of maize weevil (Coleoptera: Curculionidae).

JEENAI. Tipping, P.W. Mikolajczak, K.L.; Rodriguez, J.G.; Poneleit, C.G.; Legg, D.E. College Park, Md. : Entomological Society of

America. Journal of economic entomology. Oct 1987. v. 80 (5). p. 1010-1013. Includes references. (NAL Call No.: DNAL 421 J822).

0229

End product storage in cereals.

Jenner, C.F. New York : Alan R. Liss. Plant biology. In the series analytic: Phloem Transport / edited by J. Cronshaw, W.J. Lucas and R.T. Giaquinta. Proceedings of an International Conference, August 18-23, 1985, Asilomar, California. ~ Literature review. 1986. v. 1. p. 561-572. Includes references. (NAL Call No.: DNAL QH301.P535).

0230

Factors contributing to resistance of exotic maize populations to maize weevil, *Sitophilus zeamais*.

JCECD. Serratos, A. Arnason, J.T.; Nozzolillo, C.; Lambert, J.D.H.; Philogene, B.J.R.; Fulcher, G.; Davidson, K.; Peacock, L.; Atkinson, J.; Morand, P. New York, N.Y. : Plenum Press. Journal of chemical ecology. Apr 1987. v. 13 (4). p. 751-762. ill. Includes references. (NAL Call No.: DNAL QD415.A1J6).

0231

Gene expression in seed development and germination.

Bewley, J.D. Marcus, A. San Diego, Calif. : Academic Press. Progress in nucleic acid research and molecular biology. Literature review. 1990. v. 38. p. 165-193. Includes references. (NAL Call No.: DNAL 386 D282).

0232

Moisture content of corn in relation to relative humidity and temperature of the atmosphere.

AGUOAT. Alberts, H.W. Madison, Wis. : American Society of Agronomy. The moisture absorbing capacity of corn varied with the relative humidity. The effect of temperature upon the moisture absorbing capacity of corn at relative humidities between 10% and 90% was negligible. Above 90% relative humidity, the moisture content of corn was greatest at the lowest temperature. Below 10% relative humidity the moisture content of corn was greatest at the lowest temperature. Since a rise in temperature increases the moisture absorbing capacity of the air, it is deemed advisable to apply artificial heat together with ventilation on cold winter days to maintain a low moisture content of corn in seed corn storage houses. Agronomy journal. Nov 1926. v. 18 (11). p. 1029-1034. (NAL Call No.: DNAL 4 AM34P).

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0233

Pollen storage effects on early seedling growth  
in maize.

Pfahler, P.L. New York : Springer-Verlag,  
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proceedings, International Conference on  
Biotechnology and Ecology of Pollen, 9-11 July  
1985, Univ. of Massachusetts, Amherst, MA / ed.  
by D.L. Mulcahy, G.B. Mulcahy and E. Ottaviano.  
p. 147-152. Includes references. (NAL Call No.:  
DNAL QK658.B575).

0234

Sorbic acid as a long-term protectant in stored  
corn.

JEENAI. Dunkel, F.V. Read, N.R. College Park,  
Md. : Entomological Society of America. Journal  
of economic entomology. June 1986. v. 79 (3).  
p. 805-812. ill. Includes references. (NAL Call  
No.: DNAL 421 J822).

# PROTECTION OF PLANTS

0235

**Control of storage diseases of grain.**  
Tuite, J. Foster, G.H. Palo Alto, Annual  
Reviews. Annual review of phytopathology. 1979.  
v. 17. p. 343-366. ill. 160 ref. (NAL Call No.:  
464.8 AN72).

0236

**Degradation of malathion on wheat and corn of various moisture contents (Toxicity, stored-grain insect pests).**  
Kadoum, A.M. LaHue, D.W. College Park,  
Entomological Society of America. Journal of economic entomology. Apr 15, 1979. v. 72 (2). p. 228-229. ill. 4 ref. (NAL Call No.: 421 J822).

0237

**Grain fumigation exam : certification and re-certification. -.**  
(S.I. North Dakota Cooperative Extension Service? 1980?). Caption title ~Pesticide Applicator Training Collection. 4 leaves ; 28 cm. (NAL Call No.: SB955.G7).

0238

**Wheat production handbook (Includes culture, diseases and pests, harvesting, storage, cost and return planning, fertilizing).**  
Manhattan, Kan., The Service. C.Kansas State University. Cooperative Extension Service. July 1978. July 1978. (529). 29 p. ill. 1 ref. (NAL Call No.: 275.29 K13EX).

# PESTS OF PLANTS - GENERAL AND MISC.

0239

## Large-scale evaluation of rodent control technologies.

Richards, C.G.J. Boca Raton, Fla. : CRC Press, c1988. Rodent pest management / editor, Ishwar Prakash. Literature review. p. 269-284. Includes references. (NAL Call No.: DNAL SB994.R6R65).

# PESTS OF PLANTS - INSECTS

0240

A bibliography of maize weevils *Sitophilus zeamais* Metschulsky (Coleoptera: Curculionidae) / compiled by James E. Throne. --. Throne, James E. Washington, D.C.? : U.S. Dept. of Agriculture, Agricultural Research Service, 1986. "December 1986."--cover. 32 p. : 28 cm. --. (NAL Call No.: DNAL aS21.R44A7 no.58).

0241

A bibliography of the Rusty Grain Beetle, *Cryptolestes ferrugineus* (Stephens) (Coleoptera: Cucujidae) / compiled by James E. Throne . Throne, James E. Washington, D.C.? : U.S. Dept. of Agriculture, Agricultural Research Service ; Springfield, Va. : Available from National Technical Information Service, 1987. Cover title.~ "August 1987."~ Includes indexes. 19 p. ; 28 cm. (NAL Call No.: DNAL aS21.R44A7 no.67).

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Cereal leaf beetle, *Oulema melanopus* (L.) (Coleoptera: Chrysomelidae), responses to time in cold storage. Hoxie, R.P. EVETB. Wellso, S.G. College Park : Entomological Society of America. Environmental entomology. Dec 1983. v. 12 (6). p. 1695-1701. Includes references. (NAL Call No.: QL461.E532).

0243

Concentrations of 80:20 grain fumigant (CC14-CS2) in (grain elevator)-handling equipment during transfers of fumigated wheat. Storey, C.L. Martin, C.R.; Sukkestad, D.R. College Park, Md., Entomological Society of America. Journal of economic entomology. Apr 1981. v. 74 (2). p. 188-190. ill. 6 ref. (NAL Call No.: 421 J822).

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Effect of gamma-radiated males on egg production in *Acarus siro*. FETMA. Szlendak, E. Boczek, J.; Bruce, W.; Davis, R. Gainesville, Fla. : Florida Entomological Society. Florida entomologist. June 1985. v. 68 (2). p. 286-290. Includes references. (NAL Call No.: DNAL 420 F662).

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Final report to the North Central Regional Pesticide Impact Assessment Program on losses associated with insect infestation of farm stored shelled corn and wheat in Minnesota / by Alan V. Barak and Phillip K. Harein. Barak, Alan V. Harein, Phillip K. St. Paul, Minn. : Agricultural Experiment Station, University of Minnesota, 1981. Cover title: Losses associated with insect infestation of farm stored shelled corn and wheat in Minnesota. ii, 94 p. : ill., map ; 28 cm. Bibliography: p. 93-94. (NAL Call No.: DNAL S1.M52 no.12).

(PESTS OF PLANTS - INSECTS)

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**Grain fumigation: pesticide bans limit options.**  
CACBA. Johnson, L.A. Minneapolis, Minn. :  
Cargill, Inc. Cargill bulletin. Mar 1986. p.  
4-5. (NAL Call No.: DNAL 281.8 C19).

0251

**Insecticidal effects of cyanolipids on three species of stored product insects, European corn borer (Lepidoptera:Pyralidae) larvae, and striped cucumber beetle (Coleoptera:Chrysomelidae) (*Oryzaephilus surinamensis*, *Tribolium confusum*, *Sitophilus oryzae*, *Acalymma vittata*, *Ostrinia nubilalis*).**  
Mikolajczak, K.L. Madrigal, R.V.; Smith, C.R. Jr.; Reed, D.K. College Park, Md. : Entomological Society of America. Journal of economic entomology. Oct 1984. v. 77 (5). p. 1144-1148. Includes 18 references. (NAL Call No.: 421 J822).

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**Integrated pest management.**  
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**Malathion no longer recommended as grain protectant.**

Kantack, B. Brookings, S.D. : The Department. Field facts : soils, insects, diseases, weeds, crops - South Dakota State University, Cooperative Extension, Plant Science Department. Sept 23, 1987. v. 2 (22). p. 1. (NAL Call No.: DNAL S596.7.F44).

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**Mating behavior of the maize weevil, *Sitophilus zeamais* (Coleoptera: Curculionidae).**  
AESAAI. Walgenbach, C.A. Burkholder, W.E. College Park, Md. : The Society. Annals of the Entomological Society of America. Sept 1987. v. 80 (5). p. 578-583. ill. Includes references. (NAL Call No.: DNAL 420 EN82).

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**Neem: the tree insects hate (Margosa, seed extract as an alternative pesticide for protecting crops and stored grains).**  
Doria, J.J. Bronx, N.Y., The Garden Society, New York Botanical Garden. Garden (New York). July/Aug 1981. v. 5 (4). p. 8-10. ill. (NAL Call No.: SB403.G3).

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**Stored grain bug rules changed.**  
Kantack, B. Brookings, S.D. : The Department. Field facts : soils, insects, diseases, weeds, crops - South Dakota State University, Cooperative Extension Service, Plant Science Department. June 29, 1988. v. 3 (15). p. 3. (NAL Call No.: DNAL S596.7.F44).

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**Stored grain insect control in Oklahoma.**  
Coppock, S.P. Pitts, T. Stillwater : The Service. OSU extension facts - Cooperative Extension Service, Oklahoma State University. Mar 1983. Mar 1983. (7180). 4 p. ill. Includes references. (NAL Call No.: S544.3.0505).

0258

**Unique virus morphogenesis and cytopathology of a Baculovirus (hypertrophy strain) in larva of the armyworm, *Pseudaletia unipuncta* (Grain and product pest, biological control).**  
Tanada, Y. JIVPA. Hess, R.T.; Omi, E.M. New York : Academic Press. Journal of invertebrate pathology. Sept 1982. v. 40 (2). p. 197-204. ill. Includes references. (NAL Call No.: 421 J826).

# PESTS OF PLANTS - NEMATODES

0259

**Occurrence of *Aphelenchoides besseyi* in Louisiana rice seed and its interaction with *Sclerotium oryzae* in selected cultivars.**  
JONEB. McGawley, E.C. Rush, M.C.; Hollis, J.P.  
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Journal of nematology. Jan 1984. v. 16 (1). p.  
65-68. Includes 9 references. (NAL Call No.:  
DNAL QL391.N4J62).

# PLANT DISEASES - GENERAL

0260

Final report to the North Central Regional  
Pesticide Impact Assessment Program on losses  
associated with insect infestation of farm  
stored shelled corn and wheat in Minnesota /by

Alan V. Barak and Phillip K. Harein.

Barak, Alan V. Harein, Phillip K. St. Paul,  
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Losses associated with insect infestation of  
farm stored shelled corn and wheat in  
Minnesota. ii, 94 p. ; ill., map : 28 cm.  
Bibliography: p. 93-94. (NAL Call No.: DNAL  
S1.M52 no.12).

# PLANT DISEASES - FUNGAL

0261

**Carbon-13 and proton nuclear magnetic resonance spectral assignments of deoxynivalenol and other mycotoxins from *Fusarium graminearum* (Contaminants of cereal crops).**

Blackwell, B.A. Greenhalgh, R.; Bain, A.D. Washington, D.C. : American Chemical Society. Journal of agricultural and food chemistry. Sept/Oct 1984. v. 32 (6). p. 1078-1083. ill. Includes 35 references. (NAL Call No.: 381 J8223).

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**The Cereal rusts /edited by William R. Bushnell and Alan P. Roelfs. --.**

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0263

**Changes in the distribution of trichothecenes and zearalenone in maize with gibberella ear rot during storage at cool temperatures.**

PLDIDE. Wicklow, D.T. Bennett, G.A.; Caldwell, R.W.; Smalley, E.B. St. Paul, Minn. : American Phytopathological Society. Plant disease. Apr 1990. v. 74 (4). p. 304-305. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0264

**Corn marketing, processing, and utilization.**

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0265

**Degradation of 14C (carbon isotope)-malathion in stored corn and wheat inoculated with *Aspergillus glaucus*.**

Anderegg, B.N.JEENA. Madisen, L.J. College Park : Entomological Society of America. Journal of economic entomology. Aug 1983. v. 76 (4). p. 733-736. Includes references. (NAL Call No.: 421 J822).

0266

**An efficient technique for prolonged storage of *Phytophthora infestans* (Corn).**

Goth, R.W. Orono, Me., Potato Association of America. American potato journal. May 1981. v. 58 (5). p. 257-260. 10 ref. (NAL Call No.: 75.8 P842).

0267

**Fungal populations in U.S. farm-stored grain and their relationship to moisture, storage time, regions, and insect infestation (*Aspergillus glaucus*, oats, wheat, maize).**

Sauer, D.B. Storey, C.L.; Walker, D.E. St. Paul, Minn. : American Phytopathological Society. Phytopathology. Sept 1984. v. 74 (9). p. 1050-1053. maps. Includes 13 references. (NAL Call No.: 464.8 P56).

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**Grain quality and grading standards.**

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0269

**Hybrid differences in estimation of preharvest occurrence of bright greenish-yellow fluorescence and aflatoxin in corn (Fungi, *Aspergillus flavus*).**

Lillehoj, E.B.JEVQA. Manwiller, A.; Whitaker, T.B.; Zuber, M.S. Madison : American Society of Agronomy. Journal of environmental quality. Apr/June 1983. v. 12 (2). p. 216-219. Includes references. (NAL Call No.: QH540.U6).

0270

**Influence of temperature on the strain of *Fusarium graminearum* Schwabe in zearalenone production (Mycotoxin of stored maize).**

Naik, D.M. Busch, L.V. Ottawa, Agricultural Institute of Canada. Canadian journal of plant science. Oct 1978. v. 58 (4). p. 1095-1097. ill. 4 ref. (NAL Call No.: 450 C16).

0271

**The level of toxicogenic fungi in 1985 Maryland corn before and during storage.**

Trofa, S. Bean, G.A.; Aly, H.Y. New York : Plenum Press, c1987. Biodegradation research 1 / edited by Gerald C. Llewellyn and Charles E. O'Rear. p. 119-126. Includes references. (NAL Call No.: DNAL TA418.74.P36 1986).

0272

**Longevity of *aspergillus flavus* in corn (Fungal mycotoxins, includes other fungal species, Zea mays in the field and in storage).**

Hesseltine, C.W. Rogers, R.F. Bronx, N.Y., The New York Botanical Garden. Mycologia. May/June 1982. v. 74 (3). p. 423-426. Includes 6 ref. (NAL Call No.: 450 M99).

(PLANT DISEASES - FUNGAL)

0273

**Microflora (Storage fungi, cereal grains and their products).**

Christensen, C.M. Sauer, D.B. St. Paul, Minn. : American Association of Cereal Chemists, 1982. Storage of cereal grains and their products, 3rd ed. / edited by Clyde M. Christensen. p. 219-240. 1 p. ref. (NAL Call No.: SB190.C43 1982).

0274

**Mycotoxins in grains: causes, consequences, and cures.**

CFWOD. Young, J.C. Fulcher, R.G. St. Paul, Minn. : American Association of Cereal Chemists. Cereal foods world. Nov 1984. v. 29 (11). p. 725-728. illl. Includes references. (NAL Call No.: DNAL 59.8 C33).

0275

**Occurrence of Aphelenchoides besseyi in Louisiana rice seed and its interaction with Sclerotium oryzae in selected cultivars.**

JONEB. McGawley, E.C. Rush, M.C.; Hollis, J.P. Raleigh, N.C. : Society of Nematologists. Journal of nematology. Jan 1984. v. 16 (1). p. 65-68. Includes 9 references. (NAL Call No.: DNAL QL391.N4J62).

0276

**Preharvest fungal invasion of sorghum grain (from Kansas and Texas, Alternaria, Fusarium).**

Seitz, L.M. CECHA. Mohr, H.E.; Burroughs, R.; Glueck, J.A. St. Paul : American Association of Cereal Chemists. Cereal chemistry. Mar/Apr 1983. v. 60 (2). p. 127-130. illl. Includes references. (NAL Call No.: 59.8 C33).

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**Preserving the viability of stored maize seed with fungicides.**

Moreno-Martinez, E. Vidal-Gaona, G. St. Paul, Minn., American Phytopathological Society. Plant disease. Mar 1981. v. 65 (3). p. 260-261. 5 ref. (NAL Call No.: 1.9 P69P).

0278

**Quantification of Aspergillus flavus growth on inoculated excised kernels of corn genotypes (Zea mays, resistance, aflatoxin control, hybrid evaluation).**

Adams, N.J. AGJOAT. Scott, G.E.; King, S.B. Madison : American Society of Agronomy. Agronomy journal. Jan/Feb 1984. v. 76 (1). p. 98-102. illl. Includes references. (NAL Call No.: 4 AM34P).

0279

**Storage of high-moisture corn: fungal growth and dry matter loss.**

Seitz, L.M. Sauer, D.B.; Mohr, H.E. St. Paul, Minn., American Association of Cereal Chemists. Cereal chemistry. Mar/Apr 1982. v. 59 (2). p. 100-105. illl. Includes 15 ref. (NAL Call No.: 59.8 C33).

0280

**Storage of high-moisture corn: fungal growth and dry matter loss.**

Seitz, L.M. Sauer, D.B.; Mohr, H.E. St. Paul, Minn., American Association of Cereal Chemists. Cereal chemistry. Mar/Apr 1982. v. 59 (2). p. 100-105. illl. Includes 15 ref. (NAL Call No.: 59.8 C33).

0281

**Tiered temperature system for producing and storing conidia of Peronosclerospora sorghi.**

PLDRA. Craig, J. St. Paul, Minn. : American Phytopathological Society. Plant disease. Apr 1987. v. 71 (4). p. 356-358. illl. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0282

**Using ELISA kits to test corn for aflatoxin.**

AAREEZ. Wilcke, W.F. Ehrich, M.R.; Ko, K.W. New York, N.Y. : Springer. Two brands of commercially available, enzyme linked immunosorbent assays (ELISAs) were evaluated for use in screening corn samples for aflatoxins in nonlaboratory situations (e.g., at elevators or off farms). The ELISAs were reliable aflatoxin detectors if all direction were carefully followed, but the tests indicated more aflatoxins than was actually present for up to 17% of the samples, and the tests were faster and more accurate if conducted in a laboratory by trained personnel. Applied agricultural research. Winter 1990. v. 5 (1). p. 32-36. Includes references. (NAL Call No.: DNAL S539.5.A77).

# PLANT DISEASES - BACTERIAL

0283

## Sick wheat.

Wilcox, Robert A. MacMasters, Majel M. 1979.  
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mentions heat damage, but emphasizes moisture,  
temperature, and time during storage. It also  
gives some guidelines for prevention of sick  
wheat. Document available from: Distribution  
Center, Umberger Hall, Kansas State University,  
Manhattan, KS 66506. 7 p. : ill. (NAL Call No.:  
Not available at NAL.).(NAL Call No.: C 321).

# MISCELLANEOUS PLANT DISORDERS

0284

Influence of ammonia vapors on the dry seeds of soybean, corn, and peanut.

CRPSAY. Woodstock, L.W. Tsao, H. Madison, Wis. : Crop Science Society of America. Crop science. May/June 1986. v. 26 (3). p. 631-634. Includes references. (NAL Call No.: DNAL 64.8 C883).

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Mutagenicity of selected chemicals in barley: repair and recovery (Storage of seeds treated with alkylating agents).

Veleminsky, J. Gichner, T. New York, Plenum Press. Environmental science research. 1982. v. 24. p. 321-327. 58 ref. (NAL Call No.: TD172.E55).

0286

Recovery of two sorghum varieties from sublethal infestations of chinch bug, *Blissus leucopterus leucopterus* (Say) (Hemiptera:Lygaeidae).

Ahmad, T.R. Kindler, S.D.; Pruess, K.P. College Park, Md. : Entomological Society of America. Journal of economic entomology. Feb 1984. v. 77 (1). p. 142-150. Includes references. (NAL Call No.: 421 J822).

# PROTECTION OF PLANT PRODUCTS - GENERAL AND MISC.

0287

## Acoustic grain moisture meter.

TAAEA. Texas, S. Brusewitz, G.H. St. Joseph, Mich. : The Society. Transactions of the ASAE - American Society of Agricultural Engineers. May/June 1987. v. 30 (3). p. 853-857. ill. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

0288

## Aeration for grain storage.

Halderson, J.L. Sandvol, L.E. Moscow, Idaho, The Service. Current information series - Cooperative Extension Service, University of Idaho. Idaho. University. Cooperative Extension Service. June 1980. June 1980. (536). 6 p. ill. 7 ref. (NAL Call No.: 275.29 ID13IDC).

0289

Aflatoxin detection and determination in corn. SCSBA. Shotwell, O.L. Mississippi State : Mississippi Agricultural and Forestry Experiment Station. Southern cooperative series bulletin. Feb 1983. (279). p. 38-45. (NAL Call No.: DNAL 100 G29SO).

0290

## Aflatoxin testing procedures for corn.

SCSBA. Dickens, J.W. Whitaker, T.B. Mississippi State : Mississippi Agricultural and Forestry Experiment Station. Southern cooperative series bulletin. Feb 1983. (279). p. 35-37. (NAL Call No.: DNAL 100 G29SO).

0291

## Airflow resistance of wheat and barley affected by airflow direction, filling method and dockage.

TAAEA. Kumar, A. Muir, W.E. St. Joseph, Mich. : The Society. Transactions of the ASAE - American Society of Agricultural Engineers. Sept/Oct 1986. v. 29 (5). p. 1423-1426. ill. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

0292

Allowable storage time of corn as affected by heat buildup, natural convection and aeration. Brooker, D.B. Duggal, A.K. St. Joseph, Mich., The Society. Transactions of the ASAE - American Society of Agricultural Engineers. May/June 1982. v. 25 (3). p. 806-810. 6 ref. (NAL Call No.: 290.9 AM32T).

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## Breakage resistance of corn as a function of drying rates.

Gunasekaran, S. Paulsen, M.R. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1985 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, Summer 1985. (fiche no. 85-3024). 22 p. ill. Includes references. (NAL Call No.: DNAL FICHE 290.9 AM32P).

0294

## Carbon dioxide as a control agent for the rusty grain beetle (*Coleoptera: Cucujidae*) in stored wheat.

JEENAI. White, N.D.G. Jayas, D.S.; Sinha, R.N. Lanham, Md. : Entomological Society of America. Rusty grain beetle, *Cryptolestes ferrugineus* (Stephens), populations in bins (58 cm diameter, 168 cm high) holding 322-kg bulks of wheat were controlled in 4-6 wk at 25 +/- 3 degrees C when carbon dioxide (CO<sub>2</sub>) levels were about 20% and oxygen (O<sub>2</sub>) levels were between 5 and 10%. At temperatures declining from 21 to 7 degrees C, 99.6% of *C. ferrugineus* populations were killed in 12 wk when carbon dioxide levels gradually fell from 20 to 9% and oxygen levels rose from 16 to 19.5%. Gas levels, temperature, grain moisture content, *C. ferrugineus* adult and larval numbers, seed germination, and seed infection by *Aspergillus glaucus* group and *Penicillium* spp. fungi were monitored for 12 wk in two experiments at either 25 degrees C or <21 degrees C. In the first experiment at 25 degrees C, unsealed control bins; sealed storage bins; and sealed treatment bins with 20, 30, and 45% CO<sub>2</sub>, respectively, were used. Temperature (higher at the top of the grain mass), carbon dioxide (lower at the top), oxygen, moisture (higher at the top), germination (lower at the top), and numbers of *C. ferrugineus* adults (lower at the top) and larvae (higher at the top, except at 30 and 45% CO<sub>2</sub>) were significantly different at different levels throughout the 163-cm columns of wheat. In the second experiment at 21 to 7 degrees C, carbon dioxide and oxygen levels were similar throughout the columns of grain in unsealed control and sealed bins. In 10 and 20% CO<sub>2</sub> treatments, carbon dioxide levels were 2-3% higher in bottom than top samples. All variables except moisture were significantly different at different storage times in both experiments. All variables except *Penicillium* infection and moisture content in the warm grain or seed germination in the cool grain were different among treatments. Journal of economic entomology. Feb 1990. v. 83 (1). p. 277-288. Includes references. (NAL Call No.: DNAL 421 J822).

(PROTECTION OF PLANT PRODUCTS - GENERAL AND MISC.)

0295

**Carbon-13 and proton nuclear magnetic resonance spectral assignments of deoxynivalenol and other mycotoxins from Fusarium graminearum (Contaminants of cereal crops).**

Blackwell, B.A. Greenhalgh, R.; Bain, A.D. Washington, D.C. : American Chemical Society. Journal of agricultural and food chemistry. Sept/Oct 1984. v. 32 (6). p. 1078-1083. ill. Includes 35 references. (NAL Call No.: 381 J8223).

0296

**Caring for stored grain in Kansas.**

Manhattan, Kan. : The Service. L - Cooperative Extension Service, Kansas State University. Sept 1984. (710). 6 p. ill. (Call No.: DNAL 275.29 K13LE).

0297

**The Cereal rusts /edited by William R. Bushnell and Alan P. Roelfs. --.**

Bushnell, William R.; Roelfs, A. P. Orlando : Academic Press, c1984-1985. 2 v. : ill. ; 24 cm. Includes bibliographies and indexes. (NAL Call No.: DNAL SB741.R8C44).

0298

**Changes in the distribution of trichothecenes and zearalenone in maize with gibberella ear rot during storage at cool temperatures.**

PLDIDE. Wicklow, D.T. Bennett, G.A.; Caldwell, R.W.; Smalley, E.B. St. Paul, Minn. : American Phytopathological Society. Plant disease. Apr 1990. v. 74 (4). p. 304-305. Includes references. (NAL Call No.: DNAL 1.9 P69P).

0299

**Characteristics, handling, processing, of corn of various size and shape.**

Martin, C.R. Converse, H.H.; Czuchajowska, Z.; Lai, F.S.; Pameranz, Y. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1984 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, Winter 1984. (84-3600). 30 p. (NAL Call No.: DNAL FICHE 290.9 AM32P).

0300

**Characterization of secondary grain dust explosions.**

Schulman, C. Parnell, C.B. Jr. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1982. Paper presented at the 1982

Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1982. (fiche no. 82-3581). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

0301

**Clean grain payoff: sell all you store.**

Seim, D. Philadelphia : The Journal. Farm journal. Aug 1987. v. 111 (10). p. 22-23. ill. (NAL Call No.: DNAL 6 F2212).

0302

**Combined application of soybean oil and fungicides for dust suppression and control of storage fungi in corn and soybeans.**

McGee, D.C. Misra, M.K. St. Paul, MN : The Center, 1988? . Soybean utilization alternatives : February 16-18, 1988, a symposium / sponsored by the Center for Alternative Crops and Products ; organizing committee, Leland Hardman ... et al. ; publication editor, Laura McCann. p. 419-421. (NAL Call No.: DNAL SB205.S7S693).

0303

**Compaction factors for six crops.**

TAAEA. Malm, J.K. Backer, L.F. St. Joseph, Mich. : The Society. Transactions of the ASAE - American Society of Agricultural Engineers. Sept/Oct 1985. v. 28 (5). p. 1634-1636. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

0304

**A comparison of simulation techniques for wheat aeration.**

Schultz, L.J. Stone, M.L.; Bloome, P.D. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1984. Paper presented at the 1984 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1984. (fiche no. 84-3012). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

(PROTECTION OF PLANT PRODUCTS - GENERAL AND MISC.)

0305

A computer model for evaluating corn harvesting, handling, drying and storage systems (Chase Handling and Storage Evaluator). Bridges, T.C. Loewer, O.J. Jr. St. Joseph, Mich. Transactions of the ASAE American Society of Agricultural Engineers. May/June 1979. v. 22 (3). p. 618-621, 629. ill. 12 ref. (NAL Call No.: 290.9 AM32T).

0306

Control or suppression of aflatoxin production with pesticides. SCSBA. Draughon, F.A. Mississippi State : Mississippi Agricultural and Forestry Experiment Station. Southern cooperative series bulletin. Feb 1983. (279). p. 81-86. (NAL Call No.: DNAL 100 G29SO).

0307

Corn breakage in overseas shipments to Japan. Paulsen, M.R. Hill, L.D.; Shove, G.C.; Kuhn, T.J. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1987 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices.~ Includes statistical data. 1987. (fiche no. 87-6044). 26 p. ill. Includes references. (NAL Call No.: DNAL FICHE S-72).

0308

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**Storage of high-moisture corn: fungal growth and dry matter loss.**

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0431

**Toxigenic Fusarium scirpi in maize grain from  
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0432

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PHYTAJ. Abbas, H.K. Mirocha, C.J.; Kommedahl,  
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southern Minnesota were identified as *F. proliferatum* (11 isolates), *F. subglutinans* (23 isolates), *F. graminearum* (20 isolates), *F. moniliforme* (19 isolates), and *F. oxysporum* (eight isolates). When these isolates were single-spored, grown on a sterile rice substrate, and fed to rats, *F. proliferatum* caused hemorrhage (five isolates), diarrhea (one isolate), and death (nine isolates); *F. subglutinans* caused death (eight isolates); *F. graminearum* caused uterine enlargement (14 isolates), hemorrhage (four isolates), and death (nine isolates); *F. moniliforme* caused hemorrhage in various organs (13 isolates), diarrhea (three isolates) and death (16 isolates); and *F. oxysporum* caused hemorrhage (one isolate). All 81 isolates caused rats to gain less than those fed control diets. This is the first report of *F. proliferatum* causing organ hemorrhage as well as death. *Phytopathology*. Sept 1988. v. 78 (9). p. 1258-1260. Includes references. (NAL Call No.: DNAL 464.8 P56).

### 0433

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### 0434

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### 0437

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### 0438

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### 0439

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### 0440

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0441

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0442

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0443

**A weather risk model for grain drying system  
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TAAEA. Ziauddin, A.M. Liang, T. St. Joseph,  
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0445

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0446

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0448

## Accuracies and sample sizes associated with estimating densities of adult beetles (Coleoptera) caught in probe traps in stored barley.

JEENAI. Subramanyam, B. Harein, P.K. Lanham, Md. : Entomological Society of America. The surface of barley stored in a metal bin was divided into four concentric strata, and adults of six insect species in the top 16 cm of grain were sampled using 60 unbaited, perforated, plastic probe traps. Traps were left in grain for 1 wk on six consecutive weeks between 20 August and 2 October 1986. Except for the lesser grain borer, *Rhyzopertha dominica* (F.), the greatest amount of variation (81-89% of the total) in trap catch of the remaining five species was found among traps within strata, followed by strata within weeks (8-19%), and weeks (0-8%). Fewer adults of all six species were captured in traps in the stratum closest to the bin wall compared with strata near the bin center. Variance-mean relationships indicated that adults of the sawtoothed grain beetle, *Oryzaephilus surinamensis* (L.), and *R. dominica* were randomly distributed among the probe traps. However, the distribution of adults of *Cryptoleistes* spp.; hairy fungus beetle, *Typhaea stercorea* (L.); foreign grain beetle, *Ahasverus advena* (Waltl); and red flour beetle, *Tribolium castaneum* (Herbst), was aggregated. Except for *Cryptoleistes* spp., accuracies (expressed as a proportion of mean trap catch) in estimating mean trap catches of the remaining species improved with an increase in trap catch and the number of traps used. For *Cryptoleistes* spp., the accuracy of estimates decreased with an increase in mean trap catch but improved with an increase in the number of traps used. Except for *Cryptoleistes* spp., the number of traps required for estimating mean trap catches of the other species within 25 or 50% of the true mean decreased exponentially with an increase in trap catch. For all six species, the number of traps required increased with an increase in the mean trap catch when the accuracy was expressed as a constant value independent of trap catch. An upper ceiling on the number of traps required for estimating mean trap catches was determined by expressing the accuracy as a constant proportion  $\alpha$ . Journal of economic entomology. June 1990. v. 83 (3). p. 1102-1109. Includes references. (NAL Call No.: DNAL 421 J822).

0449

## Acoustical detection and estimation of *Rhyzopertha dominica* (F.) larval populations in stored wheat.

FETMA. Hagstrum, D.W. Webb, J.C.; Vick, K.W. Gainesville, Fla. : Florida Entomological Society. Florida entomologist. Dec 1988. v. 71 (4). p. 441-447. illl. Includes references. (NAL Call No.: DNAL 420 F662).

0450

## Acoustical monitoring of *Rhyzopertha dominica* (Coleoptera: Bostrichidae) populations in stored wheat.

JEENAI. Hagstrum, D.W. Vick, K.W.; Webb, J.C. Lanham, Md. : Entomological Society of America. Acoustical sensors provided estimates of *Rhyzopertha dominica* (F.) population increases at 27 and 32 degrees C that were comparable with estimates obtained from counts of adults in grain samples. At both temperatures, the number of insect sounds increased in proportion to insect density and averaged twice the number of adult insects. Between 7 and 70 d after eclosion, the number of adult insect sounds did not differ significantly with age. At 22 and 27 degrees C, adults produced >37 times the number of sounds produced by larvae at 27 degrees C. Thus, even though larvae were more numerous than adults, they probably did not contribute many of the sounds heard when adults were present. Journal of economic entomology. Apr 1990. v. 83 (2). p. 625-628. Includes references. (NAL Call No.: DNAL 421 J822).

0451

## Acoustical system to detect larvae in infested commodities.

FETMA. Webb, J.C. Slaughter, D.C.; Litzkow, C.A. Gainesville, Fla. : Florida Entomological Society. Florida entomologist. Dec 1988. v. 71 (4). p. 492-504. illl. Includes references. (NAL Call No.: DNAL 420 F662).

0452

## Activity of seven chitin synthesis inhibitors against development of stored product insects (Lepidoptera, Coleoptera, wheat, insecticides).

Kramer, K.J. McGregor, H.E. College Park, Md.. Entomological Society of America. Environmental entomology. Apr 1979. v. 8 (2). p. 274-276. illl. 6 ref. (NAL Call No.: QL461.E532).

0453

## An adaptable enemy--stored grain offers insects a feast.

MINSB. Obst, J. St. Paul, Minn. : The Station. Minnesota science - Agricultural Experiment Station, University of Minnesota. Fall 1987. v. 42 (3). p. 3. illl. (NAL Call No.: DNAL 100 M668).

0454

## Addendum to the inventory of stored grain insects in Michigan.

Ruppel, R.F. East Lansing, Mich. : Michigan Entomological Society. The Great Lakes entomologist. Winter 1983. v. 16 (4). p. 182. Includes references. (NAL Call No.: QL461.M5).

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0455

**Advances in insect growth regulator research with stored grain insects.**

Oberlander, H. Nickle, D. US Agric Res Ser Reprints. 47 ref. (NAL Call No.: aS21.A8U5/ARS).

0456

**Aeration for management of stored grain insects in wheat.**

Bloome, P.D. Cuperus, G.W. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1984 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, Winter 1984. (84-3517). 12 p. ill. Includes references. (NAL Call No.: DNAL FICHE 290.9 AM32P).

0457

**Aggregation and sex pheromones in the flat grain beetle, *Cryptolestes pusillus* (Schonherr) (Coleoptera: Cucujidae) (Lure method of pest control).**

Quaife, J.T. Washington, U.S. Food and Drug Administration, Executive Director of Regional Operations, Science Advisor Research Associate Program. EDRO SARAP research technical reportsUnited States Food and Drug Administration. Science Advisor Research Associate Program. June 1980. v. 5. p. 177-205. ill. 18 ref. (NAL Call No.: TX531.E2).

0458

**Aggregation pheromone of square-necked grain beetle, *Cathartus quadricollis* (Guer.).**

JCECD. Pierce, H.D. Jr. Pierce, A.M.; Johnston, B.D.; Oehlschlager, A.C.; Borden, J.H. New York, N.Y. : Plenum Press. Journal of chemical ecology. Dec 1988. v. 14 (12). p. 2169-2184. Includes references. (NAL Call No.: DNAL QD415.A1J6).

0459

**Agricultural pest control : farm storage pest control : Texas. -.**

College Station, Tex. Texas Agricultural Extension Service, Texas A&M University System (1977). Pesticide Applicator Training Collection ~Cover title ~At head of title: Using pesticides commercial applicator manual ~Reprinted 9-77. 30 p. : ill. ; 28 cm. Bibliography: p. 30. (NAL Call No.: SB937.A33).

0460

**Analysis of fenitrothion and metabolites in stored wheat.**

Abdel-Kader, M.H.K. Webster, G.R.B. New York, N.Y., Gordon and Breach Science Publishers. International journal of environmental analytical chemistry. 1982. v. 11 (2). p. 153-165. 11 ref. (NAL Call No.: QH540.I52).

0461

**Angoumois grain moth resistance in rice.**

Cogburn, R.R. Bollich, C.N. College Station, Tex. : The Texas Agricultural Experiment Station, The Texas A&M University System. Proceedings - Rice Technical Working Group. 1980. (18th). p. 36. (NAL Call No.: DNAL SB191.R5R52).

0462

**Another khapra beetle infestation confirmed by USDA in New Jersey (Pest of stored grains and cereal products).**

Washington, D.C., The Office. Major news releases and speeches - United States Department of Agriculture, Office of Governmental and Public Affairs. Apr 10/17, 1981. Apr 10/17, 1981. p. 20-21. (NAL Call No.: aS21.A8U51).

0463

**Availability of food as a factor in effectiveness of a silica aerogel against the merchant grain beetle (Coleoptera: Cucujidae).** JEENAI. Loschiavo, S.R. College Park, Md. : Entomological Society of America. Journal of economic entomology. Aug 1988. v. 81 (4). p. 1237-1240. Includes references. (NAL Call No.: DNAL 421 J822).

0464

**B. t. (*Bacillus thuringiensis*) controls (stored) grain insects.**

Martin, W. SEA-WO~AR-NC. Washington, D.C., The Administration. Agricultural research - U.S. Department of Agriculture, Science and Education Administration.United States. Dept. of Agriculture. Science and Education Administration. Mar 1980. v. 28 (9). p. 4-6. ill. (NAL Call No.: 1.98 AG84).

0465

***Bacillus thuringiensis*: a critical review.**

McGaughey, W.H. Washington, D.C. : The Service. Reprints - U.S. Department of Agriculture, Agricultural Research Service. 1986. 250 . p. 14-23. Includes references. (NAL Call No.: DNAL aS21.A8U5/ARS).

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0466

**Bacillus thuringiensis applied to stored corn using grain drying fans.**

JKESA. McGaughey, W.H. Lawrence, Kan. : The Society. Journal of the Kansas Entomological Society. Apr 1986. v. 59 (2). p. 350-355. Includes references. (NAL Call No.: DNAL 420 K13).

0467

**A bibliography of the flat grain beetle, *Cryptolestes pusillus* (Schonherr) (Coleoptera: Cucujidae).**

Throne, J.E. Beltsville, Md. : The Service. ARS - United States Department of Agriculture, Agricultural Research Service. Mar 1988. (70). 15 p. Includes references. (NAL Call No.: DNAL aS21.R44A7).

0468

**Bioenergetics of the larger grain borer, *Prostephanus truncatus* (Horn) (Coleoptera: Bostrichidae), feeding on corn.**

AESAAI. Demianyk, C.J. Sinha, R.N. College Park, Md. : The Society. Annals of the Entomological Society of America. May 1988. v. 81 (3). p. 449-459. Includes references. (NAL Call No.: DNAL 420 EN82).

0469

**Bioenergetics of *Cynaeus angustus* (Coleoptera: Tenebrionidae) feeding on stored corn.**

AESAAI. White, N.D.G. Sinha, R.N. College Park, Md. : The Society. Annals of the Entomological Society of America. Mar 1987. v. 80 (2). p. 184-190. Includes references. (NAL Call No.: DNAL 420 EN82).

0470

**Bioenergetics of *Ephestia cautella* (Walker) (Lepidoptera: Phycitidae) feeding on stored wheat.**

AESAAI. Sinha, R.N. Madrid, F.J.; White, N.D.G. College Park, Md. : The Society. Annals of the Entomological Society of America. July 1986. v. 79 (4). p. 622-628. Includes references. (NAL Call No.: DNAL 420 EN82).

0471

**Bioenergetics of the Indianmeal moth, *Plodia interpunctella* (Lepidoptera: Pyralidae).**

AESAAI. Imura, O. Sinha, R.N. College Park, Md. : The Society. Annals of the Entomological Society of America. Jan 1986. v. 79 (1). p. 91-95. 111. Includes references. (NAL Call No.: DNAL 420 EN82).

0472

**Biological activities of hexane extract of *Piper cubeba* against rice weevils and cowpea weevils (Coleoptera: Curculionidae).**

JESCEP. Su, H.C.F. Tifton, Ga. : Georgia Entomological Society. Journal of entomological science. Jan 1990. v. 25 (1). p. 16-20. Includes references. (NAL Call No.: DNAL QL461.G4).

0473

**Biological observations with *Zeteticontus* sp. (Hymenoptera: Encyrtidae) a parasite of *Carpophilus hemipterus* (L.) (Coleoptera: Nitidulidae) (Pest of dried fruits and stored cereals, natural and biological control, Israel).**

Gerling, D. Ben Mordechai, Y. Honolulu, The Society. Proceedings of the Hawaiian Entomological Society. Feb 1981. v. 23 (3). p. 351-354. 3 ref. (NAL Call No.: 420 H312).

0474

**Breeding for host plant resistance to stored rice insects (*Sitophilus oryzae*, *Rhyzopertha dominica*).**

Cogburn, R.R. TX-AR-SO. Bollich, C.N. College Station, Tex., The Station. MP - Texas Agricultural Experiment Station. July 1980. July 1980. (1451). p. 355-358. 6 ref. (NAL Call No.: 100 T31M).

0475

**Bulk density changes effected by insect-produced dust in sound wheat, grain sorghum and corn.**

TAEEA. Reed, C. Milliken, G.A. St. Joseph, Mich. : The Society. Transactions of the ASAE - American Society of Agricultural Engineers. Jan/Feb 1988. v. 31 (1). p. 221-225. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

0476

**Candidate aerosol and dust formulations for disinfecting transport vehicles, 1980-1984.**

Halliday, W.R. Kirkpatrick, R.L. College Park, Md. : Entomological Society of America. Insecticide and acaricide tests. Includes abstract. 1986. v. 11. p. 437-438. (NAL Call No.: DNAL SB950.A1I49).

0477

**Candidate aerosol and dust formulations for disinfecting transport vehicles, 1985.**

Halliday, W.R. College Park, Md. : Entomological Society of America. Insecticide and acaricide tests. Includes abstract. 1986. v. 11. p. 438-439. (NAL Call No.: DNAL

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SB950.A1I49).

0478

**Canonical correlation analysis of interactions in insect-infested stored wheat.**

White, N.D.G. Sinha, R.N. College Park, Md., Entomological Society of America. Environmental entomology. Feb 1980. v. 9 (1). p. 106-112. ill. 17 ref. (NAL Call No.: QL461.E532).

0479

**Carbon dioxide as a control agent for the rusty grain beetle (Coleoptera: Cucujidae) in stored wheat.**

JEENAI. White, N.D.G. Jayas, D.S.; Sinha, R.N. Lanham, Md. : Entomological Society of America. Rusty grain beetle, *Cryptolestes ferrugineus* (Stephens), populations in bins (58 cm diameter, 168 cm high) holding 322-kg bulks of wheat were controlled in 4-6 wk at 25 +/- 3 degrees C when carbon dioxide (CO<sub>2</sub>) levels were about 20% and oxygen (O<sub>2</sub>) levels were between 5 and 10%. At temperatures declining from 21 to 7 degrees C, 99.6% of *C. ferrugineus* populations were killed in 12 wk when carbon dioxide levels gradually fell from 20 to 9% and oxygen levels rose from 16 to 19.5%. Gas levels, temperature, grain moisture content, *C. ferrugineus* adult and larval numbers, seed germination, and seed infection by *Aspergillus glaucus* group and *Penicillium* spp. fungi were monitored for 12 wk in two experiments at either 25 degrees C or <21 degrees C. In the first experiment at 25 degrees C, unsealed control bins; sealed storage bins; and sealed treatment bins with 20, 30, and 45% CO<sub>2</sub>, respectively, were used. Temperature (higher at the top of the grain mass), carbon dioxide (lower at the top), oxygen, moisture (higher at the top), germination (lower at the top), and numbers of *C. ferrugineus* adults (lower at the top) and larvae (higher at the top, except at 30 and 45% CO<sub>2</sub>) were significantly different at different levels throughout the 163-cm columns of wheat. In the second experiment at 21 to 7 degrees C, carbon dioxide and oxygen levels were similar throughout the columns of grain in unsealed control and sealed bins. In 10 and 20% CO<sub>2</sub> treatments, carbon dioxide levels were 2-3% higher in bottom than top samples. All variables except moisture were significantly different at different storage times in both experiments. All variables except *Penicillium* infection and moisture content in the warm grain or seed germination in the cool grain were different among treatments. Journal of economic entomology. Feb 1990. v. 83 (1). p. 277-288. Includes references. (NAL Call No.: DNAL 421 J822).

0480

**Chemical communication in cucujid grain beetles.**

JCECD. Oehlschlager, A.C. Pierce, A.M.; Pierce, H.D. Jr.; Borden, J.H. New York, N.Y. : Plenum Press. Journal of chemical ecology. Nov 1988. v. 14 (11). p. 2071-2098. ill. Includes references. (NAL Call No.: DNAL QD415.A1J6).

0481

**Chemical control alternatives for stored-grain insects (Food supplies).**

Harein, P.K. St. Paul, Minn. : American Association of Cereal Chemists, 1982. Storage of cereal grains and their products, 3rd ed. / edited by Clyde M. Christensen. Literature review. p. 319-362. 10 p. ref. (NAL Call No.: SB190.C43 1982).

0482

**Chemical control of stored foodstuff insects.**

Pierrot, R. New York, N.Y. : Lavoisier Pub., c1988. Preservation and storage of grains, seeds, and their by-products : cereals, oilseeds, pulses, and animal feed / edited by J.L. Multon ; preface by A.M. Reimbert ; translated from French by D. Marsh ; reread by A.J. Eydt. p. 832-842. (NAL Call No.: DNAL SB190.C6513).

0483

**Chemical controls /Bill F. Jones, Donald R. Johnson.**

Jones, Bill F. Johnson, Donald R. Little Rock, Ark. : Cooperative Extension Service, University of Arkansas, 1984? . Abstract: This excerpted information about chemical treatment of on-farm stored grain is used in the Arkansas Pesticide Applicator Training Program. The use of rodenticides and insecticide and the equipment used for as well as the different methods of application are discussed and illustrated. Fumigation techniques are also described. Recommended dosage calibrations for all treatments are supplied. Life-threatening situations in grain storage bins are described and illustrated. Safety tips are emphasized. Reprinted from the University of Kentucky publication, "Management of on-farm stored grain", section 5. p. 59-92 : ill. ; 28 cm. (NAL Call No.: DNAL SB190.J62).

0484

**Chirality of macrolide pheromones of grain beetles in the genera *Oryzaephilus* and *Cryptolestes* and its implications for species specificity.**

JCECD. Oehlschlager, A.C. King, G.G.S.; Pierce, H.D. Jr.; Pierce, A.M.; Slessor, K.N.; Millar, J.G.; Borden, J.H. New York, N.Y. : Plenum Press. Journal of chemical ecology. June 1987.

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v. 13 (6). p. 1543-1554. Includes references.  
(NAL Call No.: DNAL QD415.A1J6).

0485

Combination of microwaves and partial vacuum for control of four stored-product insects in stored grain (*Sitotroga cerealella*, *Rhysopertha dominica*, *Sitophilus oryzae*, *Sitophilus zeamais*).

Tilton, E.W. Vardell, H.H. Athens, Ga., The Society. Journal of the Georgia Entomological Society. Jan 1982. v. 17 (1). p. 106-112.  
Includes 13 ref. (NAL Call No.: QL461.G4).

America. Journal of economic entomology. Aug 1983. v. 76 (4). p. 856-863. Includes references. (NAL Call No.: 421 J822).

0486

Combinations of partial vacuum with microwave or infrared heating of grain for insect control.

Tilton, E.W. Vardell, H.H. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. p. 538-547. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

0490

Comparison of four organophosphorus insecticides on stored wheat for control of susceptible and malathion-resistant strains of the red flour beetle (*Tribolium castaneum*). Mensah, G.W.K. Watters, F.L. College Park, Md., Entomological Society of America. Journal of economic entomology. June 1979. v. 72 (3). p. 456-461. ill. 21 ref. (NAL Call No.: 421 J822).

0487

Combined influence of temperature and moisture on red flour beetle (Coleoptera: Tenebrionidae) reproduction on whole grain wheat.

JEENAI. Lhaloui, S. Hagstrum, D.W.; Keith, D.L.; Holtzer, T.O.; Ball, H.J. College Park, Md. : Entomological Society of America. Journal of economic entomology. Apr 1988. v. 81 (2). p. 488-489. Includes references. (NAL Call No.: DNAL 421 J822).

0491

Comparison of malathion and three candidate protectants against insect pests of stored rice and advantages of encapsulation.

Cogburn, R.R. College Station, Tex., Southwestern Entomological Society. The Southwestern entomologist. Mar 1981. v. 6 (1). p. 38-43. 5 ref. (NAL Call No.: QL461.S65).

0492

Comparison of pneumatic and manual probe sampling of Kansas farm-stored grain sorghum. JEENAI. Meacher, R.L. Jr. Mills, R.B.; Rubison, R.M. College Park, Md. : Entomological Society of America. Journal of economic entomology. Feb 1986. v. 79 (1). p. 284-288. Includes references. (NAL Call No.: DNAL 421 J822).

0488

Comparative laboratory trial with insecticides under tropical conditions.

Wohlgemuth, R. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. p. 286-289. (NAL Call No.: DNAL SB937.I5 1983).

0493

A comparison of simulation techniques for wheat aeration.

Schultz, L.J. Stone, M.L.; Bloome, P.D. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1984. Paper presented at the 1984 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1984. (fiche no. 84-3012). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

0489

Comparison of fenitrothion and malathion for treatment of plywood and galvanized steel surfaces for control of the red flour beetle (Coleoptera: Tenebrionidae) and the rusty grain beetle (Coleoptera: Cucujidae) (*Tribolium castaneum*, *Cryptolestes ferrugineus*). White, N.D.G. JEENAI. Nowicki, T.W.; Watters, F.L. College Park : Entomological Society of

0494

Comparison of two dosages of hydrogen phosphide for in-transit fumigation of wheat on a bulk dry-cargo ship.

JEENAI. Redlinger, L.M. Davis, R.; Zettler, J.L.; Gillenwater, H.B.; Leesch, J.G.; Zehner, J.M.; McDonald, L.L. College Park, Md. : Entomological Society of America. Journal of economic entomology. Oct 1986. v. 79 (5). p. 1366-1371. ill. Includes references. (NAL Call

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No.: DNAL 421 J822).

0495

**Compatibility of Bacillus thuringiensis and captan when used in a mixture for treating seed corn for moth control (*Plodia interpunctella*, *Ephestia cautella*).**

McGaughey, W.H. JEENA. College Park : Entomological Society of America. Journal of economic entomology. Aug 1983. v. 76 (4). p. 897-898. Includes references. (NAL Call No.: 421 J822).

0496

**A continuous thermal treatment to eradicate insects from stored wheat.**

Lapp, H.M. Madrid, F.J.; Smith, L.B. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1986 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1986. (fiche no. 86-3008). 14 p. ill. Includes references. (NAL Call No.: DNAL FICHE S-72).

0497

**Control of a mite, *lepidoglyphus destructor*, including hypopi, in wheat with carbon disulfide (Canada).**

Barker, P.S. College Park, Md., Entomological Society of America. Journal of economic entomology. June 1982. v. 75 (3). p. 436-439. ill. Includes 15 ref. (NAL Call No.: 421 J822).

0498

**Control of the lesser grain borer, *Rhyzopertha dominica* (F.), and the rice weevil, *Sitophilus oryzae* (L.), in rough rice with a heated fluidized bed.**

Vardell, H.H. Tilton, E.W. Athens, Ga., The Society. Journal of the Georgia Entomological Society. Oct 1981. v. 16 (4). p. 521-524. 6 ref. (NAL Call No.: QL461.G4).

0499

**Control of the lesser grain borer, *Rhyzopertha dominica* (F.), and the rice weevil, *Sitophilus oryzae* (L.), in wheat with a heated fluidized bed (Disinfesting grain in marketing channels).**

Vardell, H.H. Tilton, E.W. Lawrence, Kan., The Society. Journal of the Kansas Entomological Society. July 1981. v. 54 (3). p. 481-485. 7 ref. (NAL Call No.: 420 K13).

0500

**Control stored grain insects by grain temperature management.**

Epperly, D.R. Noyes, R.T.; Cuperus, G.W.; Clary, B.L. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1987 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1987. (fiche no. 87-6035). 21 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

0501

**Controlling insect pests in farm-stored grains.** Matthew, D.L. Jr. Edwards, C.R. Lafayette : The Service. Publication E - Purdue University, Cooperative Extension Service. Aug 1983. (66, rev.). 4 p. (NAL Call No.: DNAL SB844.I6P8).

0502

**Controlling insects in bulk wheat with infrared radiation.**

JKESA. Kirkpatrick, R.L. Cagle, A. Lawrence, Kan. : The Society. Journal of the Kansas Entomological Society. July 1978. v. 51 (3). p. 386-393. Includes references. (NAL Call No.: DNAL 420 K13).

0503

**Controlling insects in stored grain.**

Johnson, D.W. Townsend, L.H. Lexington, Ky., The Service. ENT - University of Kentucky, Cooperative Extension Service. Apr 1982. Apr 1982. (19). 4 p. ill. (NAL Call No.: 275.29 K415E).

0504

**Controlling insects in stored grain (Sanitation, protection and inspection, insecticides).**

Johnson, D.W. Townsend, L.H. Lexington, Ky., The Service. ENT - University of Kentucky, Cooperative Extension Service. Aug 1981. Aug 1981. (19). 4 p. ill. (NAL Call No.: 275.29 K415E).

0505

**Corn marketing, processing, and utilization.**

AGRYA. Watson, S.A. Madison, Wis. : American Society of Agronomy. Agronomy. In the series analytic: Corn and Corn Improvement, Third Edition / edited by G.F. Sprague and J.W. Dudley. 1988. (18). p. 881-940. Includes

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references. (NAL Call No.: DNAL 4 AM392).

0506

**Cost and effectiveness of chemical insect control measures in farm-stored Kansas wheat.**  
JKESA. Reed, C. Anderson, K.; Brockschmidt, J.; Wright, V.; Pedersen, J. Lawrence, Kan. : The Society. Journal of the Kansas Entomological Society. July 1990. v. 63 (3). p. 351-360. Includes references. (NAL Call No.: DNAL 420 K13).

0507

**A counterflow particle-to-particle heat exchanger for thermal disinfection.**  
Simonton, W. Stone, M. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1985 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road.. Summer 1985. (fiche no. 85-3009). 17 p. Includes references. (NAL Call No.: DNAL FICHE 290.9 AM32P).

0508

**Cypermethrin and fenvalerate as grain protectants against *Tribolium castaneum* (Coleoptera: Tenebrionidae) and *cyptolestes ferrugineus* (Coleoptera: Cucujidae) at different moisture levels and temperatures.**  
JEENAI. Joia, B.S. Loschiavo, S.R.; Webster, G.R.B. College Park, Md. : Entomological Society of America. Journal of economic entomology. June 1985. v. 78 (3). p. 637-641. Includes references. (NAL Call No.: DNAL 421 J822).

0509

**Cypermethrin and fenvalerate residues in stored wheat and milled fractions.**  
JAFCAU. Joia, B.S. Webster, G.R.B.; Loschiavo, S.R. Washington, D.C. : American Chemical Society. Journal of agricultural and food chemistry. July/Aug 1985. v. 33 (4). p. 618-622. Includes references. (NAL Call No.: DNAL 381 J8223).

0510

**Cytopathology and experimental host range of *Rhopalosiphum padi* virus, a small isometric RNA virus infecting cereal grain aphids.**  
JIVPA. Gildow, F.E. D'Arcy, C.J. Duluth, Minn. : Academic Press. Journal of invertebrate pathology. Mar 1990. v. 55 (2). p. 245-257. illl. Includes references. (NAL Call No.: DNAL 421 J826).

0511

**Damage by rice stink bug to grain sorghum (*Oebalus pugnax*, Texas).**  
Hall, D.G. IV. Teetes, G.L. College Park, Md.. Entomological Society of America. Journal of economic entomology. June 1982. v. 75 (3). p. 440-445. Includes 4 ref. (NAL Call No.: 421 J822).

0512

**Defining the stored barley insect problem.**  
Harein, P.K. Milwaukee, Wis.? : The Association?, 1985? . Proceedings, Barley Insect Conference : January 9, 1985, Minneapolis Plaza Hotel, Minneapolis, Minnesota / sponsored by American Malting Barley Association. p. 1-6. (NAL Call No.: DNAL SB608.B2B2 1985).

0513

**Degradation of malathion on wheat and corn of various moisture contents (Toxicity, stored-grain insect pests).**

Kadoum, A.M. LaHue, D.W. College Park, Entomological Society of America. Journal of economic entomology. Apr 15, 1979. v. 72 (2). p. 228-229. illl. 4 ref. (NAL Call No.: 421 J822).

0514

**Demonstration of electronic monitoring and management of stored grain.**

Sandvol, L. Halderson, J.; Finnegan, B.; Wilson, J.; Whitmore, J.; Sharp, W.; Bechinski, E. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. p. 669-671. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

0515

**Design and analysis of competition experiments in stored-product entomology.**

Smith, R.H. Howard, D.C. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. p. 54-67. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

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0516

**Detection or estimation of insect populations in bulk-stored wheat with probe traps.**

JEENAI. Lippert, G.E. Hagstrum, D.W. College Park, Md. : Entomological Society of America. Journal of economic entomology. June 1987. v. 80 (3). p. 601-604. Includes references. (NAL Call No.: DNAL 421 J822).

1470-1477. i11. Includes references. (NAL Call No.: DNAL 421 J822).

0517

**Detritus as a factor influencing population growth rates of three tenebrionid beetles in stored corn.**

JESCEP. Arbogast, R.T. Tifton, Ga. : Georgia Entomological Society. Journal of entomological science. Oct 1989. v. 24 (4). p. 454-459. Includes references. (NAL Call No.: DNAL QL461.G4).

0520

**Development of six species of stored-product insects on multi-grain blend supplement.**

JESCEP. Mullen, M.A. Highland, H.A. Tifton, Ga. : Georgia Entomological Society. Journal of entomological science. Jan 1990. v. 25 (1). p. 21-24. Includes references. (NAL Call No.: DNAL QL461.G4).

0518

**Development and behavior of immature stages of the maize weevil (Coleoptera: Curculionidae) within kernels of resistant and susceptible maize.**

AESAAI. Urrelo, R. Wright, V.F. Lanham, Md. : The Society. Annals of the Entomological Society of America. Nov 1989. v. 82 (6). p. 712-716. Includes references. (NAL Call No.: DNAL 420 EN82).

0521

**Dielectric properties of wheat and possibilities for control of stored-grain insects by dielectric heating.**

Nelson, S.O. Washington, D.C., The Administration. Agricultural reviews and manuals. ARM-W.United States. Dept. of Agriculture. Science and Education Administration. Western Region. Office of the Regional Administrator for Federal Research. Aug 1978. Aug 1978. (4). p. 191-199. i11. 9 ref. (NAL Call No.: aS21.A75U64).

0519

**Development of a new trap to detect and monitor khapra beetle (Coleoptera: Dermestidae).**

JEENAI. Barak, A.V. Lanham, Md. : Entomological Society of America. A vertically arranged (8.9 by 7.6 cm) wall-mounted trap made of layered, corrugated paper was designed for use in USDA, Animal and Plant Health Inspection Service, Plant Protection and Quarantine detection programs for *Trogoderma granarium* Everts (khapra beetle). The trap uses a membrane or septa pheromone lure for adult males and wheat germ oil as a larval food attractant. The placement of the pheromone lure directly over a plastic collection tray containing the oil resulted in increased efficiency. Fresh oils of oat, pumpkin seed, and sesame were more attractive to larvae than wheat germ oil, but they became less attractive as the oils aged. The trap caught 3.5 times more larvae in 5 d and 4.9 times more males in 1 d compared with a commercial flat-type trap. A trap jacket with foldout rear flaps was developed to improve entry into the trap, to give direct and guided access to the collection tray, and to allow tight contact with the substrate when the trap is, wall mounted with a 2.5-cm square piece of 1.6-mm foam tape. Traps mounted on a wall did not work unless flaps were deployed. Traps mounted on a wall and in contact with the floor were most effective, but catch improved when the rear flaps were opened to bridge the gap created by the mounting tape. Journal of economic entomology. Oct 1989. v. 82 (5). p.

0522

**Dispersion of grain beetles (Coleoptera) in grain partially treated with insecticide.**

JEENAI. Collins, P.J. Sinclair, E.R.; Howitt, C.J.; Haddrill, R.L. Lanham, Md. : Entomological Society of America. Journal of economic entomology. Dec 1988. v. 81 (6). p. 1810-1815. Includes references. (NAL Call No.: DNAL 421 J822).

0523

**Distribution of angoumois grain moth, almond moth, and Indian meal moth in rice fields and rice storages in Texas as indicated by pheromone-baited adhesive traps (*Sitotroga cerealella*, *Ephhestia cautella*, *Plodia interpunctella*).**

Cogburn, R.R. Vick, K.W. College Park, Md.. Entomological Society of America. Environmental entomology. Dec 1981. v. 10 (6). p. 1003-1007. i11. Includes 7 ref. (NAL Call No.: QL461.E532).

0524

**Distribution of inhibitors of rice weevil (Coleoptera: Curculionidae) alpha-amylases in milled fractions of hard red winter wheat.**

JKESA. Baker, J.E. Lum, P.T.M. Lawrence, Kan. : The Society. Journal of the Kansas Entomological Society. Oct 1989. v. 62 (4). p. 435-439. i11. Includes references. (NAL Call No.: DNAL 420 K13).

## (PROTECTION OF PLANT PRODUCTS - INSECTS)

0525

**Distribution of the rusty grain beetle (Coleoptera: Cucujidae) in columns of wheat stored dry or with localized high moisture content (*Cryptolestes ferrugineus*).**

Loschiavo, S.R. JEENA. College Park : Entomological Society of America. Journal of economic entomology. Aug 1983. v. 76 (4). p. 881-884. ill. Includes references. (NAL Call No.: 421 J822).

0526

**An economic analysis of producers' decisions regarding insect control in stored grain.**

Anderson, K. Schurle, B.; Reed, C.; Pedersen, J. Columbus, Ohio : Ohio State University. The quantity of grain in storage has been exceptionally high through much of the early 1980s. As a result, the effect of insect activity on quality of grain that is stored for long periods of time has become a major concern. The purpose of this study was to analyze producer choices regarding treatments for control of insects in stored grain. A second degree stochastic dominance criterion was used to compare three treatments. In more than 80% of the comparisons, a protectant (malathion) was in the efficient set, which means that it could be selected by a risk-averse individual. In over 65% of the comparisons, a minimum treatment was in the efficient set. Treatment by fumigating was selected to remain in the efficient set in only 34% of the comparisons. Data from this study (before the implementation of the May 1988 regulations of the Federal Grain Inspection Service regarding insect infestation and insect-damaged kernels) suggest that elevator discounts were not consistent nor large enough to encourage farmers to incur large costs for controlling insects. North Central journal of agricultural economics. Jan 1990. v. 12 (1). p. 23-29. Includes references. (NAL Call No.: DNAL HD1773.A3N6).

0527

**Effect and control of insects affecting corn quality.**

Storey, C.L. St. Paul, MN : American Association of Cereal Chemists, Inc., c1987. Corn : chemistry and technology / edited by Stanley A. Watson, Paul E. Ramstad. p. 185-199. Includes references. (NAL Call No.: DNAL TX558.C57C6).

0528

**Effect of aggregation pheromones on efficacy of cardboard traps for sawtoothed grain beetle (Coleoptera: Cucujidae).**

JEENAI. Pierce, H.D. Jr. Pierce, A.M.; Borden, J.H.; Oehlschlager, A.C. Lanham, Md. : Entomological Society of America. Male and female sawtoothed grain beetles, *Oryzaephilus surinamensis* (L.), released on a flat arena

were recaptured in corrugated cardboard traps baited with a mixture of the male-produced aggregation pheromones 3(Z),6(Z)-dodecadien-11-olide, 3(Z),6(Z)-dodecadienolide, and 5(Z),8(Z)-tetradecadien-13-olide (cucujolides) or 1-octen-3-ol, which is produced by males and females. Both sexes were slightly more responsive to 1-octen-3-ol at low doses than to the cucujolides, but at high doses of 1-octen-3-ol the response declined precipitously. When all four pheromones were combined, the sensitivity to 1-octen-3-ol at low doses was maintained and the cucujolides overrode the repellency of 1-octen-3-ol at high doses. Dose-response curves established that the enhancement of the attraction of the cucujolides was dependent upon dose and that for equivalent performance a trap baited with the four-part mixture would require 100-fold less of cucujolides than a trap baited with only the cucujolides. Thus, the four-component mixture is highly recommended for monitoring of *O. surinamensis* in baited traps. Journal of economic entomology. Feb 1990. v. 83 (1). p. 273-276. Includes references. (NAL Call No.: DNAL 421 J822).

0529

**Effect of chlorpyrifos-methyl on oat ecosystems in farm granaries.**

JEENAI. White, N.D.G. Sinha, R.N. Lanham, Md. : Entomological Society of America. The insecticide chlorpyrifos-methyl was toxic to certain mite species when applied at 3.8 to 7.7 ppm on hulled oats (*Avena sativa* L.) or 3.1 to 5.0 ppm on hullless oats in a farm granary in southern Manitoba. Insecticide residues decreased by about 65% in hulled oats and 50% in hullless oats in 1 year and by 80% in hulled oats and 60% in hullless oats in 2 years. Bioassay of treated oats with *Tribolium castaneum* (Herbst) adults for 24 h indicated 100% mortality above 4.7 ppm and negligible mortality below 2 ppm of insecticide. Chlorpyrifos-methyl virtually eliminated the predatory mites *Androlaelaps casalis* (Berlese) and *Blattisocius keegani* Fox in treated compared with untreated hulled and hullless oats. Populations of another predatory mite, *Cheyletus eruditus* (Schrank) were depressed but began to recover when the insecticide decreased below 0.6 ppm on hulled oats. In both types of oats, populations of prey mites *Tarsonemus granarius* (Lindquist) and *Acarus siro* L. were unaffected by the insecticide. Other prey mite populations included *Aeroglyphus robustus* (Banks), which were moderately reduced, and *Lepidoglyphus destructor* (Schrank.) and *Paratriophydeus coineau* Andre, which were sharply reduced. The insecticide treatment had no effect on seed germination or microfloral infection, although these variables changed during 2 yr. The lack of impact of the insecticide on microflora, seed germination, and several mite species and the rate of insecticide degradation indicated that the original ecosystems could largely reestablish themselves in 2 yr under western Canadian storage conditions, although predator diversity was reduced. Journal of economic entomology.

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June 1990. v. 83 (3). p. 1128-1134. Includes references. (NAL Call No.: DNAL 421 J822).

0530

**Effect of disturbance (sack-drop and rotation tumbling) of wheat on four species of stored-product insects (Cryptolestes ferrugineus, Tribolium castaneum, Sitophilus granarius, Sitophilus oryzae).**

Loschiavo, S.R. Baltimore, Entomological Society of America. Journal of economic entomology. Dec 1978. v. 71 (6). p. 888-893. ill. 11 ref. (NAL Call No.: 421 J822).

0531

**Effect of dosage on the degradation of (14C) (carbon-labeled) malathion in stored wheat.**

Anderegg, B.N.JAFCA. Madisen, L.J. Washington : American Chemical Society. Journal of agricultural and food chemistry. July/Aug 1983. v. 31 (4). p. 700-704. ill. Includes references. (NAL Call No.: 381 J8223).

0532

**Effect of gamma-radiated males on egg production in Acarus siro.**

FETMA. Szlendak, E. Boczek, J.; Bruce, W.; Davis, R. Gainesville, Fla. : Florida Entomological Society. Florida entomologist. June 1985. v. 68 (2). p. 286-290. Includes references. (NAL Call No.: DNAL 420 F662).

0533

**The effect of grain stability on damage caused by Prostephanus truncatus (Horn) and three other beetle pests of stored maize.**

Cowley, R.J. Howard, D.C.; Smith, R.H. Oxford, Pergamon Press. Journal of stored products research. June 1980. v. 16 (2). p. 75-78. 14 ref. (NAL Call No.: 421 J829).

0534

**Effect of infestation by Sitotroga cerealella (Lepidoptera:Gelechiidae) and Sitophilus oryzae (Coleoptera:Curculionidae) on the deterioration of bagged wheat.**

EVETEX. Imura, O. Sinha, R.N. College Park, Md. : Entomological Society of America. Environmental entomology. Dec 1984. v. 13 (6). p. 1471-1477. Includes references. (NAL Call No.: DNAL QL461.E532).

0535

**Effect of infestation by the larger grain borer, Prostephanus truncatus (Horn), and the lesser grain borer, Rhizopertha dominica (F.) (Coleoptera: Bostrichidae), on stored corn.** EVETEX. Demianyk, C.J. Sinha, R.N. College Park, Md. : Entomological Society of America. Environmental entomology. June 1987. v. 16 (3). p. 618-624. Includes references. (NAL Call No.: DNAL QL461.E532).

0536

**Effect of insecticide distribution and storage time on the degradation of (14C (carbon isotope) ) malathion in stored wheat (Tribolium castaneum).**

Anderegg, B. N.JEENA. Madisen, L.J. College Park : Entomological Society of America. Journal of economic entomology. Oct 1983. v. 76 (5). p. 1009-1013. Includes references. (NAL Call No.: 421 J822).

0537

**Effect of moisture content on viability and infestation of hulless Terra oats in storage (Compared to a hulled cultivar).**

Sinha, R.N. White, N.D.G. Ottawa, Agricultural Institute of Canada. Canadian journal of plant science. Oct 1979. v. 59 (4). p. 911-916. ill. 14 ref. (NAL Call No.: 450 C16).

0538

**Effect of oat constituents on aggregation behavior of Oryzaephilus surinamensis (L.) (Sawtoothed grain beetle).**

Mikolajczak, K.L.JAFCA. Freedman, B.; Zilkowski, B.W.; Smith, C.R. Jr.; Burkholder, W.E. Washington : American Chemical Society. Journal of agricultural and food chemistry. Jan/Feb 1983. v. 31 (1). p. 30-33. 1 p. ref. (NAL Call No.: 381 J8223).

0539

**Effect of pyralid moth (Ephestia cautella, Plodia interpunctella) infestation on fat acidity, seed germination, and microflora of stored wheat.**

Demianyk, C.J. Sinha, R.N. College Park, Md. : Entomological Society of America. Journal of economic entomology. Oct 1981. v. 74 (5). p. 526-531. ill. 17 ref. (NAL Call No.: 421 J822).

## (PROTECTION OF PLANT PRODUCTS - INSECTS)

0540

### Effect of sorghum sprouting on adult progeny production of stored-grain insects and larval degeneration of kernels.

JKESA. Wongo, L.E. Pedersen, J.R. Lawrence, Kan. : The Society. Journal of the Kansas Entomological Society. July 1989. v. 62 (3). p. 335-341, 342. Includes references. (NAL Call No.: DNAL 420 K13).

0541

### Effect of temperature and duration of trapping on four stored grain insect species.

JEENAI. Fargo, W.S. Epperly, D.; Cuperus, G.W.; Clary, B.C.; Noyes, R. Lanham, Md. : Entomological Society of America. Capturing stored grain insects with drop traps in wheat was affected by insect species, grain temperature, and trapping duration. These results were obtained using four insect species (*Tribolium castaneum* (Herbst), *Sitophilus oryzae* (L.), *Rhyzopertha dominica* (F.), and *Cryptolestes ferrugineus* (Stephens)), three grain temperatures (10.0, 21.1, and 32.2 degrees C), and four trapping intervals (1, 2, 4, and 7 d). Higher grain temperatures resulted in significantly more insects trapped when all species were combined. This significance is largely due to the highly significant numbers of *C. ferrugineus* captured at high temperatures. The other species followed the same pattern. At each temperature, *C. ferrugineus* was caught in the greatest numbers and *R. dominica* in the least. *S. oryzae* and *T. castaneum* were captured in intermediate numbers. Across species, longer trapping durations resulted in significantly more insects being captured. Across durations, *C. ferrugineus* was caught the most, *R. dominica* the least, with the other two species intermediate. Within species, only *C. ferrugineus* showed significant differences in the number trapped among the sampling periods. The trend, however, was consistent for all insect species. This study emphasizes the need to consider differences in insect species, grain temperatures, and trapping durations when drop traps are used to estimate insect abundance. Journal of economic entomology. June 1989. v. 82 (3). p. 970-973. Includes references. (NAL Call No.: DNAL 421 J822).

0542

### Effect of temperature on the Efficacy of methyl bromide against adults of *Sitophilus granarius* (L.) (Coleoptera: Curculionidae) on soft and hard wheats.

JEENAI. Cherif, R. Leesch, J.; Davis, R. College Park, Md. : Entomological Society of America. Journal of economic entomology. June 1985. v. 78 (3). p. 660-665. 111. Includes references. (NAL Call No.: DNAL 421 J822).

0543

### Effectiveness of chlorpyrifos-methyl and malathion as protectants for high moisture stored wheat (Control of *Sitophilus oryzae*, *Tribolium castaneum*, *Rhyzopertha dominica*, and *Oryzaephilus surinamensis*).

Quinlan, J.K. White, G.D. Baltimore, Entomological Society of America. Journal of economic entomology. Feb 15, 1979. v. 72 (1). p. 90-93. 111. 6 ref. (NAL Call No.: 421 J822).

0544

### Effects of infestations by three stored-product mites (*Lepidoglyphus destructor*, *Acarus farris*) on fat acidity, seed germination, and microflora of stored wheat.

White, N.D.G. Henderson, L.P. College Park, Md., Entomological Society of America. Journal of economic entomology. Oct 1979. v. 72 (5). p. 763-766. 111. 18 ref. (NAL Call No.: 421 J822).

0545

### Effects of insect density, trap depth, and attractants on the capture of *Tribolium castaneum* (Coleoptera: Tenebrionidae) and *Cryptolestes ferrugineus* (Coleoptera: Cucujidae) in stored wheat.

JEENAI. White, N.D.G. Loschiavo, S.R. College Park, Md. : Entomological Society of America. Journal of economic entomology. Aug 1986. v. 79 (4). p. 1111-1117. 111. Includes references. (NAL Call No.: DNAL 421 J822).

0546

### Effects of malathion dust on Indian meal moth and almond moth (Lepidoptera: Phycitidae) Infestation of stored wheat (Plodia interpunctella, *Ephestia cautella*).

Madrid, F.J. JEENAI. White, N.D.G.; Sinha, R.N. College Park : Entomological Society of America. Journal of economic entomology. Dec 1983. v. 76 (6). p. 1401-1404. Includes references. (NAL Call No.: 421 J822).

0547

### Effects of moisture content and initial insect density on ability of rusty grain beetles (Coleoptera: Cucujidae) to infest whole corn.

JESCEP. Throne, J.E. Tifton, Ga. : Georgia Entomological Society. Journal of entomological science. Jan 1990. v. 25 (1). p. 25-29. Includes references. (NAL Call No.: DNAL QL461.G4).

(PROTECTION OF PLANT PRODUCTS - INSECTS)

0548

**Effects of Myristica fragrans fruit (family: Myristicaceae) to four species of stored-product insects.**

JESCEP. Su, H.C.F. Tifton, Ga. : Georgia Entomological Society. Journal of entomological science. Apr 1989. v. 24 (2). p. 168-173. Includes references. (NAL Call No.: DNAL QL461.G4).

0549

**Effects of noncatastrophic control technologies that alter life history parameters on insect population growth: a simulation study.**

EVETEX. Throne, J.E. Lanham, Md. : Entomological Society of America. I investigated the effects of noncatastrophic control technologies that alter life history parameters (such as the use of resistant plant varieties) on the growth of insect populations. I used a computer model to simulate population dynamics of the flat grain beetle, *Cryptolestes pusillus* (Schonherr). The effects of increasing duration of larval development (by 5, 10, 15, or 20 d) or decreasing fecundity or larval survival (by 25, 50, or 75%) on population growth were simulated. Growth curves for populations with reductions in fecundity or larval survival were nearly identical. The effects of decreasing fecundity or larval survival were apparent during the first generation, whereas the effects of increasing duration of larval development did not become apparent until the second generation. Altering any of the life history parameters resulted in as much as 99% reduction in population levels at constant temperatures and as much as 87% reduction in population levels at actual temperatures in a grain bin. The results indicate that use of control technologies that cause even a small change in a life history parameter may have a significant effect on population growth when applied over a growing or storage season. The combination of such technologies with other methods of control may improve the cost effectiveness of pest management techniques, even if the noncatastrophic control techniques do not provide adequate control when used alone. Environmental entomology. Dec 1989. v. 18 (6). p. 1050-1055. Includes references. (NAL Call No.: DNAL QL461.E532).

0550

**The effects of rearing temperatures on certain aspects of the biology of *Corcyra cephalonica* (Stainton), the rice moth.**

Osman, N.B. Wright, V.F.; Mills, R.B. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. p. 99-106. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

0551

**Effects of stored-product beetle infestation on fat acidity, seed germination, and microflora of wheat (*Cryptolestes ferrugineus*, *Oryzaephilus surinamensis*).**

Sinha, R.N.JEENA. College Park : Entomological Society of America. Journal of economic entomology. Aug 1983. v. 76 (4). p. 813-817. Includes references. (NAL Call No.: 421 J822).

0552

**Effects of threshing and drying on maize weevil populations in field-infested corn.**

JEENAI. Keever, D.W. Wiseman, B.R.; Widstrom, N.W. College Park, Md. : Entomological Society of America. Journal of economic entomology. Apr 1988. v. 81 (2). p. 727-730. Includes references. (NAL Call No.: DNAL 421 J822).

0553

**Effects of two insect growth regulators (hydroprene and R-20458) on the follicular epithelium and the oocytes of the rice weevil, *Sitophilus oryzae* (L.) (Coleoptera: Curculionidae) (Genetic control of stored product pests, morphology).**

Mkhize, J.M.JNYEA. Gupta, A.P. Lawrence : The Society. Journal of the New York Entomological Society. Sept 1982. v. 90 (3). p. 213-218. ill. 2 p. ref. (NAL Call No.: 420 N48J).

0554

**Effects of weevil (Coleoptera: Curculionidae) infestation on abiotic and biotic quality of stored wheat.**

JEENAI. Sinha, R.N. College Park, Md. : Entomological Society of America. Journal of economic entomology. Dec 1984. v. 77 (6). p. 1483-1488. Includes references. (NAL Call No.: DNAL 421 J822).

0555

**Effects of whole corn kernels and extracts on behavior of maize weevil (Coleoptera: Curculionidae).**

JEENAI. Tipping, P.W. Mikolajczak, K.L.; Rodriguez, J.G.; Poneleit, C.G.; Legg, D.E. College Park, Md. : Entomological Society of America. Journal of economic entomology. Oct 1987. v. 80 (5). p. 1010-1013. Includes references. (NAL Call No.: DNAL 421 J822).

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0556

**Effects of 2-tridecanone and analogues on the reproduction and mortality of stored product insects.**

JKESA. Kramer, K.J. Beeman, R.W.; Speirs, W.E.; Burkholder, W.E.; McGovern, T.P. Lawrence, Kan. : The Society. Journal of the Kansas Entomological Society. Apr 1985. v. 58 (2). p. 254-260. Includes references. (NAL Call No.: DNAL 420 K13).

0557

**Efficacy and characteristics of dominicalure in field trapping lesser grain borers, *Rhyzopertha dominica* (F.).**

Cogburn, R.R. Burkholder, W.E.; Williams, H.J. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. p. 629-630. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

0558

**Efficacy of perforated tubing in assisting phosphine distribution for in-transit fumigation of export corn (Control method for stored-product insects, *Sitophilus zeamais*, *Rhyzopertha dominica*, *Tribolium confusum*).**

Zettler, J.L. Gillenwater, H.B.; Redlinger, I.M.; Leesch, J.G.; Davis, R.; McDonald, L.L.; Zehner, J.M. College Park, Md. : Entomological Society of America. Journal of economic entomology. June 1984. v. 77 (3). p. 675-679. ill. Includes references. (NAL Call No.: 421 J822).

0559

**Efficacy of tricalcium phosphate as a legume grain protectant.**

Davis, R. Boczek, J.; Pankiewicz-Nowicka, D.; Kruk, M. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. p. 256-261. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

0560

**Emergence of the larger black flour beetle as a major pest of farm-stored grain in Minnesota (*Cynaeus angustus*).**

Barak, A.V. Dunkel, F.V.; Harein, P.K. College Park, Md., Entomological Society of America. Journal of economic entomology. Dec 15, 1981. v. 74 (6). p. 726-729. ill., map. Includes 20 ref. (NAL Call No.: 421 J822).

0561

**Energy budget for *Oryzaephilus surinamensis* (Coleoptera: Cucujidae) feeding on rolled oats.** White, N.D.G. Sinha, R.N. College Park, Md., Entomological Society of America. Environmental entomology. June 1981. v. 10 (3). p. 320-326. ill. 19 ref. (NAL Call No.: QL461.E532).

0562

**Energy consumption and food utilization of the Indian meal moth (Lepidoptera: Pyralidae) on different corn genotypes.**

JKESA. Hockensmith, P.E. Devine, T.L.; Legg, D.E.; Rodriguez, J.G. Lawrence, Kan. : The Society. Journal of the Kansas Entomological Society. Oct 1986. v. 59 (4). p. 598-603. Includes references. (NAL Call No.: DNAL 420 K13).

0563

**EPA regulation for grain fumigation.**

Criswell, J.T. Stillwater, Okla. : The Service Circular E - Oklahoma State University, Cooperative Extension Service. Paper presented at the 1990 Proceedings, Fumigation Workshop. Jan 1989. (888). p. 31-52. ill. (NAL Call No.: DNAL 275.29 OK41C).

0564

**Estimation of aerial density of the lesser grain borer (Coleoptera: Bostrichidae) in a warehouse using dominicalure traps.**

JEENAI. Leos-Martinez, J. Granovsky, T.A.; Williams, H.J.; Vinson, S.B.; Burkholder, W.E. College Park, Md. : Entomological Society of America. Journal of economic entomology. Aug 1986. v. 79 (4). p. 1134-1138. ill. Includes references. (NAL Call No.: DNAL 421 J822).

0565

**Evaluation of *Bacillus thuringiensis* for controlling indianmeal moths (Lepidoptera: Pyralidae) in farm grain bins and elevator silos.**

JEENAI. McGaughey, W.H. College Park, Md. : Entomological Society of America. Journal of economic entomology. Oct 1985. v. 78 (5). p. 1089-1094. Includes references. (NAL Call No.: DNAL 421 J822).

0566

**Evaluation of black pepper as a protectant of wheat in storage against rice weevils (*Sitophilus oryzae*).**

Su, H.C.F. Athens : The Society. Journal of the Georgia Entomological Society. Jan 1984. v. 19 (1). p. 45-48. Includes references. (NAL Call No.: QL461.G4).

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0567

**Evaluation of chlorpyrifos-methyl and chlorpyrifos-methyl plus methoprene as protectants of stored corn: small bin tests.**  
JEENAI. Arthur, F.H. Throne, J.E.; Simonaitis, R.A.; Zehner, J.M. Lanham, Md. : Entomological Society of America. Chlorpyrifos-methyl applied at 6 ppm and a combination of 6 ppm chlorpyrifos-methyl + 1 ppm methoprene were evaluated as protectants of stored corn (*Zea mays L.*) against a standard malathion application of 8 ppm and an untreated control. Corn was treated in October 1987, placed in 10-, 19-, and 76-bu bins, and infested at selected intervals with red flour beetle, *Tribolium castaneum* (Herbst); flat grain beetle, *Cryptolestes pusillus* (Schonherr); maize weevil, *Sitophilus zeamais* Motschulsky; and Indianmeal moth, *Plodia interpunctella* (Hubner). Indianmeal moths did not establish populations on treated or untreated corn. Beetle populations in untreated controls were not abundant until June 1988 (8 mo after application). After 12 mo, red flour beetle and flat grain beetle populations were significantly greater in corn treated with malathion than in corn treated with either chlorpyrifos-methyl or chlorpyrifos-methyl + methoprene. Maize weevil populations were not significantly different among the three chemical treatments. Moisture content was not significantly different between treated and untreated corn or among the chemical treatments. Dockage and weight loss were significantly greater in untreated than in treated corn after 8 mo. After 12 mo, weight loss was significantly greater in malathion-treated corn than in corn treated with either chlorpyrifos-methyl or chlorpyrifos-methyl + methoprene. Insect population levels or insect damage did not differ significantly between the latter two treatments. Journal of economic entomology. June 1990. v. 83 (3). p. 1114-1121. Includes references. (NAL Call No.: DNAL 421 J822).

0568

**Evaluation of fenoxycarb, *Bacillus thuringiensis*, and malathion as grain protectants in small bins.**  
JEENAI. Kramer, K.J. Hendricks, L.H.; Wojciak, J.H.; Flyer, J. College Park, Md. : Entomological Society of America. Journal of economic entomology. June 1985. v. 78 (3). p. 632-636. ill. 9 ref. Includes references. (NAL Call No.: DNAL 421 J822).

0569

**Evaluation of four analytical methods to detect weevils in wheat: granary weevil, *Sitophilus granarius* (L.), in soft white wheat.**  
JFPRDR. Russell, G.E. Ames, Iowa : International Association of Milk, Food, and Environmental Sanitarians. Journal of food protection. July 1988. v. 51 (7). p. 547-553. Includes references. (NAL Call No.: DNAL 44.8 J824).

0570

**Evaluation of pheromone-baited traps for monitoring of cucujid and tenebrionid beetles in stored grain.**  
JEENAI. Javer, A. Borden, J.H.; Pierce, H.D. Jr.; Pierce, A.M. Lanham, Md. : Entomological Society of America. Plastic probe traps, corrugated cardboard traps, and weighing boat traps, either pheromone baited or unbaited, were tested for their efficacy in recapturing adults of six species of stored grain beetles released in lots of 100 into bins containing 60 kg of wheat. Probe traps were generally superior, although there were instances in which either or both of the other trap types were competitive with probe traps. Pheromone baits (cucujolides) improved the efficiency of one or more of the trap types for the cucujids *Oryzaephilus surinamensis* (L.), *O. mercator* (Fauvel), *Cryptolestes ferrugineus* (Stephens), and *C. pusillus* (Schonherr). However, a (+/-)-4,8-dimethyldecanal bait did not improve the efficacy of any trap type for the tenebrionids *Tribolium castaneum* (Herbst) or *T. confusus* Jacquelin du Val. The results suggest that for each target species, pheromone, trap type, and habitat, the development of optimal monitoring programs should be based on independent and rigorous experimental evaluation. Journal of economic entomology. Feb 1990. v. 83 (1). p. 268-272. Includes references. (NAL Call No.: DNAL 421 J822).

0571

**Evaluation of pirimiphos-methyl as a protectant for export grain.**  
JEENAI. Redlinger, L.M. Zettler, J.L.; Davis, R.; Simonaitis, R.A. College Park, Md. : Entomological Society of America. Journal of economic entomology. Apr 1988. v. 81 (2). p. 718-721. Includes references. (NAL Call No.: DNAL 421 J822).

0572

**Evidence for a male-produced aggregation pheromone in the rice weevil (*Sitophilus oryzae*, pest of stored cereal grains).**  
Phillips, J.K. Burkholder, W.E. College Park, Md., Entomological Society of America. Journal of economic entomology. Oct 1981. v. 74 (5). p. 539-542. ill. 9 ref. (NAL Call No.: 421 J822).

0573

**Exit holes by cigarette beetles and lesser grain borers through paper bags treated with permethrin or synergized pyrethrins (*Lasioderma serricorne*, *Rhyzopertha dominica*).**  
Highland, H.A. GENSA. Athens : The Society. Journal of the Georgia Entomological Society. Jan 1983. v. 18 (1). p. 65-71. Includes references. (NAL Call No.: QL461.G4).

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0574

**Factors affecting survival of the merchant grain beetle (Coleoptera: Cucujidae) and the confused flour beetle (Coleoptera: Tenebrionidae) exposed to silica aerogel.**  
JEENAI. White, N.D.G. Loschiavo, S.R. Lanham, Md. : Entomological Society of America. Mortality of *Dryzaephilus mercator* Fauvel exposed to 0.72 mg/cm<sup>2</sup> silica aerogel (SG-67) bound to paper was directly related to length of exposure of the insects and length of time between exposure and placement in food. Exposures of 15 s killed 97% of starved adults in 2 d, but mortality was low if adults had access to food within 2 h. As exposure times increased, insects survived only if food was available at shorter intervals. Type and quantity of food also affected mortality. Mortality of *O. mercator* adults exposed to SG-67 was greater on bread crumbs and whole rolled oats than on ground rolled oats. Starved *Tribolium confusum* Jacquelin du Val required exposures of 6 h to SG-67 for complete mortality; the presence of food following exposure, rather than type or quantity, affected survival, although mortality was slightly higher on bread crumbs. Early larval instars of *O. mercator* and *T. confusum* were more susceptible than late instars, which responded to SG-67 in the same way as adults. Adults of both species exposed to SG-67 and subsequently held in inert cellulose powder died within 1-3 d, but many insects in ground rolled oats survived, probably because they had ingested and metabolized food and produced metabolic water. Adult *O. mercator* immobilized at 2.5 degrees C during exposure to SG-67 for 4 h, then held at 25 degrees C without food, were unaffected by the treatment. Exposures of *D. mercator* for 15-60 s to silica aerogel on an adhesive surface will effectively control these insects if they cannot find food immediately. *T. confusum* cannot be controlled with exposure times of less than 6 h. Journal of economic entomology. June 1989. v. 82 (3). p. 960-969. ill. Includes references. (NAL Call No.: DNAL 421 J822).

0575

**Factors contributing to resistance of exotic maize populations to maize weevil, *Sitophilus zeamais*.**  
JCECD. Serratos, A. Arnason, J.T.; Nozzolillo, C.; Lambert, J.D.H.; Philogene, B.J.R.; Fulcher, G.; Davidson, K.; Peacock, L.; Atkinson, J.; Morand, P. New York, N.Y. : Plenum Press. Journal of chemical ecology. Apr 1987. v. 13 (4). p. 751-762. ill. Includes references. (NAL Call No.: DNAL QD415.A1J6).

0576

**Factors influencing stored-oat insect populations in South Dakota.**  
JEENAI. Ingemansen, J.A. Reeves, D.L.; Walstrom, R.J. College Park, Md. : Entomological Society of America. Journal of economic entomology. Apr 1986. v. 79 (2). p.

518-522. Includes references. (NAL Call No.: DNAL 421 J822).

0577

**Factors influencing the distribution of maize weevil (Coleoptera: Curculionidae) eggs on maize.**  
EVETEX. Legg, D.E. Barney, J.B.; Tipping, P.W.; Rodriguez, J.G. College Park, Md. : Entomological Society of America. Environmental entomology. June 1987. v. 16 (3). p. 809-813. Includes references. (NAL Call No.: DNAL QL461.E532).

0578

**Factors that affect the relative resistance of rough rice to angoumois grain moths and lesser grain borers (*Sitotroga cerealella*, *Rhyzopertha dominica*).**  
Cogburn, R.R. EVETB. Bollich, C.N.; Meola, S. College Park : Entomological Society of America. Environmental entomology. June 1983. v. 12 (3). p. 936-942. ill. Includes references. (NAL Call No.: QL461.E532).

0579

**Feasibility and results of population dynamics studies on stored grain insects in small scale bins with simulated climatic conditions.**  
Lessard, F.F. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. p. 68-77. ill. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

0580

**Feasibility of fumigating unmodified river barges with phosphine while in transit.**  
JEENAI. Zettler, J.L. Leesch, J.G.; Gillenwater, H.B.; Redlinger, L.M.; Davis, R.; Zehner, J.M. College Park, Md. : Entomological Society of America. Journal of economic entomology. Oct 1986. v. 79 (5). p. 1315-1318. Includes references. (NAL Call No.: DNAL 421 J822).

0581

**The federal grain inspection service and insect infestation in grain.**  
Mathews, R.H. Milwaukee, Wis.? : The Association?, 1985? . Proceedings, Barley Insect Conference : January 9, 1985, Minneapolis Plaza Hotel, Minneapolis, Minnesota / sponsored by American Malting Barley Association. p. 50-54. (NAL Call No.: DNAL SB608.B2B2 1985).

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0582

**Feeding and mortality of *Sitophilus granarius* (L.) adults during simulated winter farm bin temperatures (Pests of stored grain).**

Granovsky, T.A. Mills, R.B. College Park, Md., Entomological Society of America. Environmental entomology. Apr 15, 1982. v. 11 (2). p. 324-326. Includes 6 ref. (NAL Call No.: QL461.E532).

0583

**Feeding damage of three stored-product moths (Lepidoptera: Pyralidae) on wheat (*Ephestia cautella*, *Plodia interpunctella*, *Pyralis farinalis*).**

Madrid, F.J. JEENA. Sinha, R.N. College Park : Entomological Society of America. Journal of economic entomology. Dec 1982. v. 75 (6). p. 1017-1020. ill. 13 ref. (NAL Call No.: 421 J822).

0584

**Fenoxy carb as a long-term protectant for stored rough rice.**

JEENAI. Cogburn, R.R. College Park, Md. : Entomological Society of America. Journal of economic entomology. Apr 1988. v. 81 (2). p. 722-726. Includes references. (NAL Call No.: DNAL 421 J822).

0585

**Field tests with probe traps for sampling adult insects infesting farm-stored grain.**

Subramanyam, B. Harein, P.K.; Cutkomp, L.K. Clemson, S.C. : South Carolina Entomological Society. Journal of agricultural entomology. Jan 1989. v. 6 (1). p. 9-21. ill. Includes references. (NAL Call No.: DNAL SB599.J69).

0586

**Field tests with the aggregation pheromone of the lesser grain borer (Coleoptera: Bostrichidae) (*Rhyzopertha dominica*, pest of stored grains).**

Cogburn, R.R. Burkholder, W.E.; Williams, H.J. College Park, Md. : Entomological Society of America. Environmental entomology. Feb 1984. v. 13 (1). p. 162-166. Includes references. (NAL Call No.: QL461.E532).

0587

**Final report to the North Central Regional Pesticide Impact Assessment Program on losses associated with insect infestation of farm stored shelled corn and wheat in Minnesota /by Alan V. Barak and Phillip K. Harein.**

Barak, Alan V. Harein, Phillip K. St. Paul, Minn. : Agricultural Experiment Station,

University of Minnesota, 1981. Cover title: Losses associated with insect infestation of farm stored shelled corn and wheat in Minnesota. ii, 94 p. : ill., map ; 28 cm. Bibliography: p. 93-94. (NAL Call No.: DNAL S1.M52 no.12).

0588

**The foreign grain beetle (*Ahasverna advena*).** Christensen, C. Cincinnati, Somick Publishing. PCT, pest control technology. July 1980. v. 8 (7). p. 28-29. ill. (NAL Call No.: SB950.2.A1P4).

0589

**Fumigation : category 7C / (prepared by Harold J. Stockdale and Linda A. Buntin).** - Stockdale, Harold J. Buntin, Linda A. & Iowa commercial pesticide applicator manual. Ames, Iowa Cooperative Extension Service, Iowa State University 1980. Pesticide Applicator Training Collection ~Cover title ~At head of title: Iowa commercial pesticide applicator manual ~"September 1980. ~CS-27. 35, (1) p., (1) p. of plates : ill., map, form ; 28 cm. (NAL Call No.: SB955.S72 1980).

0590

**Fumigation of empty grain drying bins with chloropicrin, phosphine, and liquid fumigant mixtures (*Tribolium castaneum*, *Sitophilus oryzae*).**

Quinlan, J.K. McGaughey, W.H. College Park, Md. : Entomological Society of America. Journal of economic entomology. Feb 1983. v. 76 (1). p. 184-187. Includes references. (NAL Call No.: 421 J822).

0591

**Fumigation of farm-stored grain (Insect control, Idaho).**

Sandvol, L.E. Homan, H.W.; Halderson, J.L. Moscow : The Service. Current information series - Cooperative Extension Service, University of Idaho. Feb 1982. Feb 1982. (644). 2 p. (NAL Call No.: 275.29 ID13IDC).

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**Fumigation pest control training for certification / Jim Hamer ... et al.**  
Hamer, Jim L. Mississippi State? : Cooperative Extension Service, Mississippi State University, 1985? . Abstract: This is a self-study manual designed for commercial pesticide applicator certification in fumigation pest control. It discusses the nature and effect of fumigants, precautions, protective equipment, and detection, symptoms and emergency treatment for acute poisoning by

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fumigants. The identification, biology and behavior of Stored Grain Insect Pests is also covered. vii, 51, 7 p. : ill. ; 28 cm. Includes bibliographical references. (NAL Call No.: DNAL SB955.F84).

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**Further infestations of khapra beetle found (in New Jersey and Maryland warehouses, pests of stored grain).**

Washington, D.C., The Office. Major news releases and speeches - United States Department of Agriculture, Office of Governmental and Public Affairs. Dec 12/19, 1980. Dec 12/19, 1980. p. 11. (NAL Call No.: aS21.A8U51).

0594

**Genetic analysis of fenitrothion resistance in the sawtoothed grain beetle, *Oryzaephilus surinamensis* (Coleoptera: Cucujidae).**  
JEENA! . Collins, P.J. College Park, Md. : Entomological Society of America. Journal of economic entomology. Oct 1986. v. 79 (5). p. 1196-1199. Includes references. (NAL Call No.: DNAL 421 J822).

0595

**Genetic resistance in cereal grains to storage insects (Rice weevil *Sitophilus oryzae*).**  
Boles, H.P. Pomeranz, Y. Washington, D.C., The Administration. Agricultural reviews and manuals. ARM-W.United States. Dept. of Agriculture. Science and Education Administration. Western Region. Office of the Regional Administrator for Federal Research. Aug 1978. Aug 1978. (4). p. 180-190. ill. 22 ref. (NAL Call No.: aS21.A75U64).

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MacLean, J.T. Beltsville, Md. : The Library. Quick bibliography series - National Agricultural Library. May 1982. Bibliography. May 1982. (82-12). 18 p. (NAL Call No.: aZ5071.N3).

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**Grain pesticides**American Association of Cereal Chemists. --.

Washington, D.C.? : The Association, 1985. Title from container. 4 videocassettes (362 min.) : sd., col. ; 1/2 in. (NAL Call No.: DNAL Videocassette no.21).

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**Grain protectants for insect control--methods and equipment for bulk treatment (Insecticides, storage).**

Quinlan, J.K. Washington, D.C., The Department. Marketing bulletin - United States, Dept. of Agriculture. July 1982. July 1982. (72). 12 p. ill. (NAL Call No.: A280.39 AG8M).

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**Grain sampling and insect damaged kernels.**  
Anderson, K. Stillwater, Okla. : The Service. Circular E - Oklahoma State University, Cooperative Extension Service. In series analytic: 1989 Oklahoma grain elevator workshop manual. 1989. (881). 7 p. (NAL Call No.: DNAL 275.29 OK41C).

0601

**Heat sensitivity of the Indian meal moth, *Plodia interpunctella* (Hubner), immatures (Pests of stored grain, control).**  
Vardell, H.H. Tilton, E.W. Athens, Ga., The Society. Journal of the Georgia Entomological Society. Jan 1981. v. 16 (1). p. 7-11. (NAL Call No.: QL461.G4).

0602

**Heat sensitivity of the lesser grain borer, *Rhyzopertha dominica* (F.) (Pests of stored grain).**  
Vardell, H.H. Tilton, E.W. Athens, Ga., The Society. Journal of the Georgia Entomological Society. Jan 1981. v. 16 (1). p. 116-121. 6 ref. (NAL Call No.: QL461.G4).

0603

**Heat sterilization (superheating) as a control for stored-grain pests in a food plant.**  
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0604

**Heritability of resistance to stored-product insects in three hybrid population of rice.**  
EVETEX. Cogburn, R.R. Bollich, C.N. Lanham, Md. : Entomological Society of America. Environmental entomology. Apr 1990. v. 19 (2). p. 268-273. Includes references. (NAL Call No.: DNAL QL461.E532).

0605

**History of an insect infestation in durum wheat during transport and storage in an inland terminal elevator in Canada (Cryptolestes ferrugineus, Tribolium castaneum, Lathridius, minutus).**  
Smith, L.B. Loschiavo, S.R. Oxford. Journal of stored products research. Dec 1978. v. 14 (4). p. 169-180. ill. 10 ref. (NAL Call No.: 421 J829).

0606

**Identification and control of common insect pests of stored feed grains.**  
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0607

**Identification of larvae and pupae of the larger grain borer, Prostephanus truncatus (Coleoptera, Bostrichidae), and the larger black flour beetle, Cynaeus angustus (Coleoptera, Tenebrionidae).**  
Spilman, T.J. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. p. 44-53. ill. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

0608

**In-transit shipboard fumigation of corn on tanker vessel.**  
Zettler, J.L.JEENA. Gillenwater, H.B.; Redlinger, L.M.; Leesch, J.G.; Davis, R. College Park : Entomological Society of America. Journal of economic entomology. Oct 1982. v. 75 (5). p. 804-808. ill. Includes references. (NAL Call No.: 421 J822).

0609

**In-transit shipboard fumigation of grain: research to regulation.**  
CFWOD. Davis, R. Barrett, R.H. St. Paul, Minn. : American Association of Cereal Chemists. Cereal foods world. Mar 1986. v. 31 (3). p. 227-229. ill. Includes 11 references. (NAL Call No.: DNAL 59.8 C333).

0610

**In-transit shipboard fumigation of wheat on a tanker (Insect pest control, USA).**  
Redlinger, L.M.JEENA. Leesch, J.G.; Davis, R.; Zettler, J.L.; Gillenwater, H.B.; Zehner, J.M. College Park : Entomological Society of America. Journal of economic entomology. Dec 1982. v. 75 (6). p. 1147-1152. ill. 6 ref. (NAL Call No.: 421 J822).

0611

**Incidence of malathion-resistance among storage insects from the southern rice industry.**  
Cogburn, R.R. College Station, Tex. : The Texas Agricultural Experiment Station, The Texas A&M University System. Proceedings - Rice Technical Working Group. Meeting held February 14-16, 1978, College Station, Texas. ~ Includes abstract. 1978. (17th). p. 44. (NAL Call No.: DNAL SB191.R5R52).

0612

**Induction of sterility in (stored grain pest) Zabrotes subfasciatus (Boh.) (Bruchidae: Coleoptera) by the use of gamma radiation.**  
Pajni, H.R. Jabbal, A. Bangalore, Current Science Association. Current science. July 5, 1979. v. 48 (13). p. 604-606. ill. 6 ref. (NAL Call No.: 475 SCI23).

0613

**Infestation by Cryptolestes ferrugineus (Coleoptera: Cucujidae) of newly harvested wheat stored on three Kansas farms.**  
JEENAI. Hagstrom, D.W. Lanham, Md. : Entomological Society of America. The vertical distributions of Cryptolestes ferrugineus (Stephens) in newly harvested wheat, *Triticum aestivum* L., on three Kansas farms during the first two months of storage were studied to characterize the process of infestation. In three bins, the number of adult *C. ferrugineus* tended to decrease from top to bottom layers of grain. In the fourth bin, the numbers decreased from top and bottom layers to middle layers. A regression model explained 82.2% of the variation between bins. These data suggest that most of the insect infestation occurred after the wheat was loaded into the bin instead of before or during loading and that insects then dispersed from the grain surfaces into the grain mass. Journal of economic entomology. Apr

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### 0614

Influence of mechanical damage and repeated infestation of sorghum on its resistance to *Sitophilus oryzae* (L.) (Coleoptera: Curculionidae) (Stored grain pests, sorghum cultivars).

Williams, J.O. Mills, R.B. Oxford, Pergamon Press. Journal of stored products research. June 1980. v. 16 (2). p. 51-53. 5 ref. (NAL Call No.: 421 J829).

### 0615

The influence of starvation on mortality, development, and protein content in parasitized and unparasitized *Tribolium castaneum*.

JIVPA. Armstrong, E. Newton, P.B. New York, N.Y. : Academic Press. Journal of invertebrate pathology. July 1985. v. 46 (1). p. 103-108. Includes references. (NAL Call No.: DNAL 421 J826).

### 0616

Influence of the molting cycle on the aggregation response of *Trogoderma glabrum* (Coleoptera: Dermestidae) larvae to wheat germ oil.

Nara, J.M. EVETB. Burkholder, W.E. College Park : Entomological Society of America. Environmental entomology. June 1983. v. 12 (3). p. 703-706. Includes references. (NAL Call No.: QL461.E532).

### 0617

Infrared heating with vacuum for control of the lesser grain borer, (*Rhyzopertha dominica* F.) and rice weevil (*Sitophilus oryzae* (L.)) infesting wheat (Stored-product insect control).

Tilton, E.W. GENSA. Vardell, H.H.; Jones, R.D. Athens : The Society. Journal of the Georgia Entomological Society. Jan 1983. v. 18 (1). p. 61-64. Includes references. (NAL Call No.: QL461.G4).

### 0618

Inhalation exposure of grain samplers and grain inspectors to carbon tetrachloride.

ACSMC. Deer, H.M. McJilton, C.E.; Karein, P.K.; Sumner, W. Washington, D.C. : The Society. ACS Symposium series - American Chemical Society. 1985. (273). p. 221-241. Includes 57 references. (NAL Call No.: DNAL QD1.A45).

### 0619

Inheritance of malathion resistance in a strain of *Tribolium castaneum* (Coleoptera: Tenebrionidae) and effects of resistance genotypes on fecundity and larval survival in malathion-treated wheat.

JEENAI. White, N.D.G. Bell, R.J. Lanham, Md. : Entomological Society of America. Malathion resistance in a strain of *Tribolium castaneum* (Herbst) was found to be malathion specific, triphenyl phosphate suppressible, autosomal, monofactorial, and semidominant after 15 generations of selection on up to 600 ppm malathion in flour. Confirmation of inheritance patterns was determined by filter paper resistance tests and repeatedly backcrossing heterozygotes to susceptibles. On wheat treated with 0, 4, 8 ppm malathion, with or without ground wheat (dockage), progeny production on insecticide-treated wheat was greatest by homozygous resistant parents, whereas heterozygous parents were more productive than homozygous ones on untreated wheat. Different instars raised to adult on the same malathion-treated medium showed that the presence of dockage increased survival and that homozygous resistant larvae were much more resistant than heterozygotes. Mortality was greater in all larvae than in adults. At present, low frequency levels of malathion-resistant strains of *T. castaneum* in Canada, and immigration of susceptible adults raising the proportion of heterozygous or susceptible progeny, should minimize control failures with malathion. Journal of economic entomology. Feb 1988. v. 81 (1). p. 381-386. Includes references. (NAL Call No.: DNAL 421 J822).

### 0620

Inheritance of resistance in whole kernel maize to oviposition by the maize weevil (Coleoptera: Curculionidae).

JEENAI. Tipping, P.W. Cornelius, P.L.; Legg, D.E.; Poneleit, C.G.; Rodriguez, J.G. Lanham, Md. : Entomological Society of America. Inheritance of resistance in maize, *Zea mays* L., to oviposition by the maize weevil, *Sitophilus zeamais* Motschulsky, was investigated by first crossing 10 inbred lines (A619, B37, B68, B73, H95, Mo17, N28, Pa91, R805, and T220) in all possible combinations (full diallel) in two environments (Florida and Kentucky). Resulting F1 seed was evaluated for resistance to the maize weevil. Remnant F1 seed was then planted, and the F2 seed was evaluated for resistance as before. A significant environmental influence occurred on the expression of resistance; maize grown in Florida was consistently more susceptible to maize weevil attack than that grown in Kentucky. Generally, however, the most resistant genotypes in one environment were among the most resistant in the other. Other findings indicated that general combining ability and, to a lesser extent, specific combining ability were important in the heritability of resistance to the maize weevil. A significant maternal effect occurred on resistance in the F1 but it generally was not

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present in the F2 seed. Conclusions are that, using these genotypes, development of hybrids with significant maize weevil resistance should be possible because the resistance factors were principally influenced by general combining ability and maternal effects were not expressed past the F1 generation. Journal of economic entomology. Oct 1989. v. 82 (5). p. 1466-1469. Includes references. (NAL Call No.: DNAL 421 J822).

0621

**Insect answers: Meal moths.**

WUEXA. Antonelli, A.L. Thomasson, G.L.; Davidson, R.M. Pullman, Wash. : The Service. Extension bulletin - Washington State University, Cooperative Extension Service. Sept 1986. (1396). 4 p. ill. (NAL Call No.: DNAL 275.29 W27P).

0622

**Insect control at sea.**

AGREA. Adams, S. Washington, D.C. : The Administration. Agricultural research - U.S. Department of Agriculture, Agricultural Research Service. Jan 1987. v. 35 (1). p. 6-10. ill. (NAL Call No.: DNAL 1.98 AG84).

0623

**Insect control in farm-stored grain.**

Storey, C.L. Speirs, R.D.; Henderson, L.S. Washington, D.C., National Association of Wheat Growers. Wheat grower. Apr 1980. v. 3 (4). p. 19-20, 22-23, 26-28. ill. (NAL Call No.: SB191.W5W42).

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**Insect control in farm-stored grain.**

Storey, C.L. Speirs, R.D. Washington, D.C., The Department. Farmers' bulletin. United States. Dept. of Agriculture. Dec 1979. Dec 1979. (2269). 18 p. ill., map. 4 ref. (NAL Call No.: 1 AG84F).

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**Insect control in farm stored grain (by fumigation, fumigants, application).**

Brookings, S.D., The Service. EC. 1980. 1980: (738). 6 p. ill. (NAL Call No.: 275.29 S085).

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Storey, Charles L., 1930-. Washington, D.C. : U.S. Dept. of Agriculture, Science and Education Administration, 1979. 18 p. : ill., map --. (NAL Call No.: DNAL Fiche S-70 no.2269).

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**Insect control in stored grain and peas and seed treatment for small grains.**

WA. Pullman, Wash., The Service. EM - Cooperative Extension Service, Washington State University. Washington State University. Cooperative Extension Service. Feb 1980. Feb 1980. (3314). 7 p. (NAL Call No.: 275.29 W27MI).

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Pullman, Wash., The Service. E.M. Washington State University. Cooperative Extension Service. Feb 1979. Feb 1979. (3314). 7 p. (NAL Call No.: 275.29 W27MI).

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**Insect-damaged kernels--wheat.**

Anderson, K.B. Noyes, R.T.; Cuperus, G.W. Stillwater, Okla. : The Service. OSU extension facts - Cooperative Extension Service, Oklahoma State University. Sept 1989. (510). 4 p. ill. Includes references. (NAL Call No.: DNAL S544.3.0505).

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**Insect disinestation of grain and fruit (Irradiation techniques, control agents).**

Tilton, E.W. Burdin, A.K. Jr. Boca Raton, Fla. : CRC Press, c1983. Preservation of food by ionizing radiation / editors, E.S. Josephson, M.S. Peterson. Literature review. p. 215-229. Includes references. (NAL Call No.: TP371.8.P74 V.3).

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**Insect distribution in bulk-stored wheat in relation to detection or estimation of abundance.**

EVETEX. Hagstrum, D.W. M1111ken, G.A.; Waddell, M.S. College Park, Md. : Entomological Society of America. Environmental entomology. Dec 1985. v. 14 (6). p. 655-661. Includes references. (NAL Call No.: DNAL QL461.E532).

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Insect infestation in grain loaded in railroad cars at primary elevators in Southern Manitoba, Canada.

JEENAI. Smith, L.B. College Park, Md. : Entomological Society of America. Journal of economic entomology. June 1985. v. 78 (3). p. 531-534. ill. Includes references. (NAL Call No.: DNAL 421 J822).

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Insect infestation in western Canadian grain loaded in railway cars at primary elevators. Smith, L.B. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. p. 651-654. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

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Insect infestation of farm-stored shelled corn and wheat in Minnesota (Grain pests).

Barak, A.V. Harein, P.K. College Park, Md. : Entomological Society of America. Journal of economic entomology. Apr 1981. v. 74 (2). p. 197-202. ill. 18 ref. (NAL Call No.: 421 J822).

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Insect infestations in wheat and corn exported from the United States.

Storey, C.L. JEENA. Sauer, D.B.; Ecker, O.; Fulk, D.W. College Park : Entomological Society of America. Journal of economic entomology. Oct 1982. v. 75 (5). p. 827-832. Includes references. (NAL Call No.: 421 J822).

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Insect pest management for farm stored grain.

McBride, D.K. Fargo, N.D. : The Service. Extension bulletin - North Dakota State University of Agriculture and Applied Science, Cooperative Extension Service. Jan 1986. (45). 17 p. ill. (NAL Call No.: DNAL S544.3.N9N6).

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Insect pests of stored rice.

Cogburn, R.R. Westport, Conn. : AVI Pub. Co., c1980. Rice--production and utilization / edited by Bor S. Luh. p. 289-310. Includes references. (NAL Call No.: DNAL SB191.R5R497).

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Insect pheromones: methods for detection of storage insects in rice.

Cogburn, R.R. Vick, K.W.; Burkholder, W.E. College Station, Tex. : The Texas Agricultural Experiment Station, The Texas A&M University System. Proceedings - Rice Technical Working Group. Includes abstract. 1982. (19th). p. 56-57. (NAL Call No.: DNAL SB191.R5R52).

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Insect population dynamics at the surface of refrigerated wheat bulks of up to 15,000 tonnes.

Elder, W.B. Ghaly, T.F. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. p. 78-98. ill. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

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Insect populations in aerated and unaerated stored wheat in Oklahoma.

JKESA. Cuperus, G.W. Prickett, C.K.; Bloome, P.D.; Pitts, J.T. Lawrence, Kan. : The Society. Journal of the Kansas Entomological Society. Oct 1986. v. 59 (4). p. 620-627. Includes references. (NAL Call No.: DNAL 420 K13).

0641

Insect populations in wheat, corn, and oats stored on the farm (*Cryptolestes pusillus*, *Rhyzopertha dominica*, *Oryzaephilus surinamensis*, *Tribolium castaneum*, *Sitophilus oryzae*, *Latheticus oryzae*).

Storey, C.L. JEENA. Sauer, D.B.; Walker, D. College Park : Entomological Society of America. Journal of economic entomology. Dec 1983. v. 76 (6). p. 1323-1330. Includes references. (NAL Call No.: 421 J822).

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Insect prevention in farm stored grain (Control of pests).

Brookings, S.D., The Service. EC. 1981. 1981. (737). 3 p. ill. (NAL Call No.: 275.29 S085).

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Insect succession in a stored-corn ecosystem in southeast Georgia.

AESAAI. Arbogast, R.T. Mullen, M.A. Lanham, Md. : The Society. Annals of the Entomological Society of America. Nov 1988. v. 81 (6). p. 899-912. ill. Includes references. (NAL Call No.: DNAL 420 EN82).

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0644

Insecticidal effects of cyanolipids on three species of stored product insects, European corn borer (Lepidoptera:Pyralidae) larvae, and striped cucumber beetle (Coleoptera:Chrysomelidae) (*Oryzaephilus surinamensis*, *Tribolium confusum*, *Sitophilus oryzae*, *Acalymma vittata*, *Ostrinia nubilalis*). Mikolajczak, K.L. Madrigal, R.V.; Smith, C.R. Jr.; Reed, D.K. College Park, Md. : Entomological Society of America. Journal of economic entomology. Oct 1984. v. 77 (5). p. 1144-1148. Includes 18 references. (NAL Call No.: 421 J822).

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Insects (in stored grains and seeds). Cotton, R.T. Wilbur, D.A. St. Paul, Minn. : American Association of Cereal Chemists, 1982. Storage of cereal grains and their products, 3rd ed. / edited by Clyde M. Christensen. p. 281-318. ill. 3 p. ref. (NAL Call No.: SB190.C43 1982).

0646

Insects infesting barley stored on farms in Minnesota. JEENAI. Subramanyam, B. Harein, P.K. Lanham, Md. : Entomological Society of America. Barley stored on farms in Minnesota in 12 storage facilities during 1985 and 17 facilities during 1986 was sampled for adults of insect species. Grain samples were removed with grain probing devices or a plastic scoop, and live insects were trapped with unbaited plastic probe traps. Analysis of grain and probe trap samples indicated that, on average, about 85.0 to 100.0% of the facilities holding barley were infested with more than one insect species. The insect species most commonly occurring in grain or probe trap samples were *Cryptolestes* spp.; red flour beetle, *Tribolium castaneum* (Herbst); sawtoothed grain beetle, *Oryzaephilus surinamensis* (L.); foreign grain beetle, *Ahasverus advena* (Waltl); lesser grain borer, *Rhyzopertha dominica* (F.); and hairy fungus beetle, *Typhaea stercorea* (L.). *Cryptolestes* spp. and *O. surinamensis* were the most abundant insect species. Indianmeal moth, *Plodia interpunctella* (Hubner), larvae or adults were rarely found in the grain or probe trap samples, although adult males were captured in pheromone traps that were placed above the grain. Temperature of the grain in July and August 1985 and grain samples between May and September 1986 was within the range (15.6 to 35.0 degrees C) conducive for insect survival and reproduction. Moisture content of the grain samples during 1985 ranged from 12.0 to 16.0% and from 11.0 to 20.0% in 1986. These moisture levels were adequate to support insect infestations. Moisture content of the grain samples during 1985 and 1986 decreased by approximately 0.1 and 0.2%, respectively, for every 1 degrees C rise in grain temperature between 7 and 35 degrees C. Based on test weight of the grain samples, 5 of 12 facilities

during 1985 and 3 of 17 facilities during 1986 held poor quality barley (U.S. Sample Grade). The amount of dockage in the grain samples ranged from 0.0 to 4.6%. Comparison of probe traps and grain sampling devices indicated that probe traps were more sensitive than a deep-bin cup probe, a. Journal of economic entomology. Dec 1989. v. 82 (6). p. 1817-1824. Includes references. (NAL Call No.: DNAL 421 J822).

0647

Interaction of maize weevil (Coleoptera: Curculionidae) and parasitoid *Anisopteromalus calandrae* (Hymenoptera: Pteromalidae) in a small bulk of stored corn.

JEENAI. Arbogast, R.T. Mullen, M.A. Lanham, Md. : Entomological Society of America. Monthly samples of a stored-corn ecosystem in southeastern Georgia were used to examine interaction between the maize weevil, *Sitophilus zeamais* Motschulsky, and its parasitoid, *Anisopteromalus calandrae* (Howard). Counts of adults were made when the samples were taken. Counts were made again after the samples had been held at 30 degrees C and 60% RH for 1 wk and for 3 wk. Host and parasitoid develop within grain kernels; at any time, their numbers can be divided into interstitial and intrakernel populations. Interstitial populations, estimated by the first count, consisted of adults that were in the interstices of the grain mass when a sample was taken. In these populations, numerical response of the parasitoid to host density was clear and indicated a degree of natural control. The intrakernel populations, estimated by counts 2 and 3 combined, included immature stages and adults that had not yet emerged from grain kernels at the time of sampling. Analysis of these populations showed that the rate of parasitism responded to changes in host density, but lagged behind. This delayed density-dependence allowed enough fluctuation in the weevil population for significant damage to occur during periods of peak population density. Nevertheless, *A. calandrae* may be an effective biological control agent if it is introduced in sufficient numbers early in the storage period to suppress the initial buildup of weevil populations. For long storage periods, additional introductions would be required to prevent weevil populations from rebounding once the parasite population declined. Journal of economic entomology. Dec 1990. v. 83 (6). p. 2462-2468. Includes references. (NAL Call No.: DNAL 421 J822).

0648

Interactions between maize weevil (Coleoptera: Curculionidae) infestations and infection by *Aspergillus flavus* and other fungi in stored corn.

JESCEP. Dix, D.E. All, J.N. Tifton, Ga. : The Entomological Science Society. Journal of Entomological Science. Apr 1987. v. 22 (2). p. 108-118. Includes references. (NAL Call No.: DNAL QL461.G4).

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0649

**Interspecific sexual attraction between Pyralis farinalis L. and Amyelois transitella (Walker) (Lepidoptera: Pyralidae) (Minor stored grain pest, ecology).**

Landolt, P.J. Curtis, C.E. Lawrence, Kan., The Society. Journal of the Kansas Entomological Society. Apr 1982. v. 55 (2). p. 248-252. ill. Includes 9 ref. (NAL Call No.: 420 K13).

0650

**Ionizing radiation for insect control in grain and grain products.**

CFWOD. Tilton, E.W. Brower, J.H. St. Paul, Minn. : American Association of Cereal Chemists. Cereal foods world. Literature review. Apr 1987. p. 330-335. Includes references. (NAL Call No.: DNAL 59.8 C333).

0651

**Joint effects of temperature and insecticides on mortality and fecundity of Sitophilus oryzae (Coleoptera: Curculionidae) in wheat and maize.**  
JEENAI. Thaung, M. Collins, P.J. College Park, Md. : Entomological Society of America. Journal of economic entomology. Aug 1986. v. 79 (4). p. 909-914. Includes references. (NAL Call No.: DNAL 421 J822).

0652

**Keep cats clean.**

SDFHA. Ingemansen, J. Brookings, S.D. : The Station. South Dakota farm and home research - South Dakota, Agricultural Experiment Station. 1986. v. 37 (2). p. 3-5. ill. (NAL Call No.: DNAL 100 S082S).

0653

**Khapra beetle infestation found in New Jersey warehouse (Pests of stored grains).**

Washington, D.C., The Office. Major news releases and speeches - United States Department of Agriculture, Office of Governmental and Public Affairs. Mar 5/12, 1982. Mar 5/12, 1982. p. 23-24. (NAL Call No.: aS21.A8U51).

0654

**Khapra beetle inspection program draws to a close (Stored grain pests, United States).**

Washington, D.C., The Office. Major news releases and speeches - United States Department of Agriculture, Office of Governmental and Public Affairs. Feb 27/Mar 6, 1981. Feb 27/Mar 6, 1981. p. 14-15. (NAL Call No.: aS21.A8U51).

0655

**Laboratory evaluation of dill seed extract in reducing infestation of rice weevil in stored wheat.**

JESCEP. Su, H.C.F. Tifton, Ga. : Georgia Entomological Society. Journal of entomological science. July 1989. v. 24 (3). p. 317-320. Includes references. (NAL Call No.: DNAL QL461.G4).

0656

**Laboratory trapping studies with Sitophilus zeamais (Coleoptera: Curculionidae).**

JEENAI. Walgenbach, C.A. Burkholder, W.E.; Curtis, M.J.; Khan, Z.A. College Park, Md. : Entomological Society of America. Journal of economic entomology. Aug 1987. v. 80 (4). p. 763-767. Includes references. (NAL Call No.: DNAL 421 J822).

0657

**Large scale evaluation of fluid-bed heating as a means of disinfesting grain.**

Evans, D.E. Thorpe, G.R.; Sutherland, J.W. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. p. 523-530. ill. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

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**Low-temperature degradation of malathion in stored wheat.**

Abdel-Kader, M.H.K. Webster, G.R.B.; Loschiavo, S.R.; Watters, F.L. College Park, Md., Entomological Society of America. Journal of economic entomology. Oct 1980. v. 73 (5). p. 654-656. 13 ref. (NAL Call No.: 421 J822).

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**Macrolide (cucujolide) biosynthesis in the rusty grain beetle, Cryptolestes ferrugineus I.**  
ISBCA. Vanderwel, D. Pierce, H.D. Jr.; Oehlschlager, A.C.; Borden, J.H.; Pierce, A.M. Elmsford, N.Y. : Pergamon Press. Insect biochemistry. 1990. v. 20 (6). p. 567-572. Includes references. (NAL Call No.: DNAL QL495.A1I57).

0660

**Malathion aerosols applied in conjunction with vertically placed aeration for the control of insects in stored corn.**

Quinla, J.K. Lawrence, Kans., The Society. Journal. Kansas Entomological Society. Oct 1979. 52 (4). p. 648-652. ill. 4 ref. (NAL Call No.:

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420 K13).

0661

**Malathion resistance in Indian meal moths (Lepidoptera: Pyralidae) infesting stored corn and wheat in the North-Central United States (Plodia interpunctella).**

Beeman, R.W. JEENA. Speirs, W.E.; Schmidt, B.A. College Park : Entomological Society of America. Journal of economic entomology. Dec 1982. v. 75 (6). p. 950-954. ill., map. 1 p. ref. (NAL Call No.: 421 J822).

0662

**Malathion resistance in larvae of some southern Minnesota populations of the Indianmeal moth, Plodia interpunctella (Lepidoptera: Pyralidae), infesting bulk-stored shelled corn.**

GRLEA. Sumner, W.A. II. Harein, P.K.; Subramanyam, Bh. East Lansing, Mich. : Michigan Entomological Society. The Great Lakes entomologist. Fall 1988. v. 21 (3). p. 133-137. Includes references. (NAL Call No.: DNAL QL461.M5).

0663

**Management of stored barley in Minnesota: practices versus recommendations.**

Gardner, R.D. Harein, P.K.; Subramanyam, B. College Park, Md. : The Society. Bulletin of the Entomological Society of America. Spring 1988. v. 34 (1). p. 22-26. Includes references. (NAL Call No.: DNAL 423.9 EN8).

0664

**Managing insects in farm-stored grain.**

Foster, Dave. Stockdale, Harold. Document available from: Iowa State University, Publications Distribution, Printing & Publications Bldg., Ames, Iowa 50011 1983. Provides a simple program of sanitation, protectants, and monitoring to follow to keep grain that is sufficiently dry and cool, free of insect damage. 4 p. : ill. (NAL Call No.: Document available from source.).(NAL Call No.: Pm-205).

0665

**Managing stored grain: keeping the investment safe (Insect infestation and molds).**

Obst, J. St. Paul, Minn. : The Station. Minnesota science - Minnesota Agricultural Experiment Station. 1983. v. 38 (4). p. 14-15. ill. (NAL Call No.: 100 M668).

0666

**Mating behavior of the maize weevil, Sitophilus zeamais (Coleoptera: Curculionidae).**  
AESAAI. Walgenbach, C.A. Burkholder, W.E. College Park, Md. : The Society. Annals of the Entomological Society of America. Sept 1987. v. 80 (5). p. 578-583. ill. Includes references. (NAL Call No.: DNAL 420 EN82).

0667

**Metabolism of methyl bromide by susceptible and resistant strains of the granary weevil, Sitophilus granarius (L.) (Pesticide detoxification, wheat).**  
Starratt, A.N. Bond, E.J. New York, Academic Press. Pesticide biochemistry and physiology. June 1981. v. 15 (3). p. 275-281. 20 ref. (NAL Call No.: SB951.P49).

0668

**Methods of applying Bacillus thuringiensis (biological control organism) to stored corn for moth (Plodia interpunctella, Ephestia cautella) control.**

McGaughey, W.H. AR-NC. Dicke, E.B. College Park, Md., Entomological Society of America. Journal of economic entomology. Apr 1980. v. 73 (2). p. 228-229. ill. 3 ref. (NAL Call No.: 421 J822).

0669

**Methods of applying carbon dioxide for insect control in stored grain.**

Jay, E. AR-SO~AR-SO. New Orleans, La., The Region. Advances in agricultural technology AAT-S - U.S. Dept. of Agriculture, Science and Education Administration.United States. Dept. of Agriculture. Science and Education Administration. Agricultural Research. Southern Region. Apr 1980. Apr 1980. (13). 7 p. ill. 6 ref. (NAL Call No.: aS21.A75U7).

0670

**Methyl bromide and other grain fumigants.**

Sargent, J.E. Stillwater, Okla. : The Service. Circular E - Oklahoma State University, Cooperative Extension Service. Paper presented at the 1990 Proceedings, Fumigation Workshop. Jan 1989. (888). p. 25-30. (NAL Call No.: DNAL 275.29 OK41C).

0671

**Methyl bromide toxicity at various low temperatures and exposure periods to Angoumois grain moth (*Sitotroga cerealella*) and Indian meal moth (*Plodia interpunctella*) in popcorn.**  
Vincent, L.E. Rust, M.K.; Lindgren, D.L. College Park, Md., Entomological Society of

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America. Journal of economic entomology. Apr 1980. v. 73 (2). p. 313-317. ill. 7 ref. (NAL Call No.: 421 J822).

0672

## Modified atmosphere technology.

Storey, C.L. Milwaukee, Wis.? : The Association?, 1985? . Proceedings, Barley Insect Conference : January 9, 1985, Minneapolis Plaza Hotel, Minneapolis, Minnesota / sponsored by American Malting Barley Association. p. 14-21. (NAL Call No.: DNAL SB608.B2B2 1985).

0673

## Mold-damaged grain sorghum as a diet for three stored-grain beetles (Coleoptera) (*Tribolium castaneum*, *Cynaeus angustus*, *Cryptolestes pusillus*).

Wright, V.F. EVETB. Burroughs, R. College Park : Entomological Society of America. Environmental entomology. Apr 1983. v. 12 (2). p. 558-560. Includes references. (NAL Call No.: QL461.E532).

0674

## Monitoring for the Angoumois grain moth (*Sitotroga cerealella*) in corn.

Stockel, J. Sureau, F. New York : Plenum Press, c1981. Management of insect pests with semiochemicals : concepts and practice / edited by Everett R. Mitchell. p. 63-73. ill. 15 ref. (NAL Call No.: SB933.3.M36).

0675

## Moth control in stored grain and the role of *Bacillus thuringiensis*: an overview.

RREVA. Subramanyam, B. Cutkomp, L.K. New York, N.Y. : Springer. Residue reviews. Literature review. 1985. v. 94. p. 1-47. ill. Includes references. (NAL Call No.: DNAL 389.9 R314).

0676

Movement of a weevil parasitoid, *Anisopteromalus calandrae* (Howard), within a column of wheat in relation to host location. Press, J.W. Clemson, S.C. : South Carolina Entomological Society. Journal of agricultural entomology. July 1988. v. 5 (3). p. 205-208. ill. (NAL Call No.: DNAL SB599.J69).

0677

## Mycotoxin toxicity to *Tryphophagus putrescentiae* (arthropod associated with fungi in stored food products or stored grain).

Rodriguez, J.G. Potts, M.F.; Rodriguez, L.D. College Park, Md., Entomological Society of America. Journal of economic entomology. Apr 1980. v. 73 (2). p. 282-284. ill. 3 ref. (NAL Call No.: 421 J822).

0678

## New stored grain insect prevention and control materials.

Harein, P. Minneapolis, The Council. Crop production conference report - Crop Quality Council. Crop Quality Council. 1979. 1979. (46th). p. 55-58. (NAL Call No.: 464.9 N813).

0679

## Nonedible seed oils as insect repellent (against stored grain insects, *Tribolium castaneum*).

Khan, M.W.Y. JJASD. Ahmad, F.; Osman, S.M. Champaign : The Society. Journal of the American Oil Chemists' Society. May 1983. v. 60 (5). p. 949-950. Includes references. (NAL Call No.: 307.8 J82).

0680

## On-farm grain storage facilities and management practices in Kentucky.

Barney, R.J. Legg, D.E.; Sedlacek, J.D. Lanham, Md. : The Society. Bulletin of the Entomological Society of America. Winter 1989. v. 35 (4). p. 26-33. Includes references. (NAL Call No.: DNAL 423.9 EN8).

0681

Organophosphate resistance in adults of red flour beetle (Coleoptera: Tenebrionidae) and sawtoothed grain beetle (Coleoptera: Cucujidae) infesting barley stored on farms in Minnesota. JEENAI. Subramanyam, B. Harein, P.K.; Cutkomp, L.K. Lanham, Md. : Entomological Society of America. Four strains of adult red flour beetles, *Tribolium castaneum* (Herbst), and six strains of adult sawtoothed grain beetles, *Oryzaephilus surinamensis* (L.), infesting barley stored on farms in Minnesota were surveyed for resistance to malathion, pirimiphos-methyl, and chlorpyrifos-methyl. Adults were exposed to filter papers impregnated with each of the insecticides. Dose-response and discriminating-dose test procedures were used to evaluate pirimiphos-methyl and chlorpyrifos-methyl resistance. Dose-response and discriminating-dose tests indicated malathion resistance in all field strains of *T. castaneum*, but not in *O. surinamensis* field strains. *T. castaneum* strains did not show

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cross-resistance to pirimiphos-methyl or chlorpyrifos-methyl. All six *O. surinamensis* strains were susceptible to pirimiphos-methyl, but four strains showed reduced susceptibility (tolerance) to chlorpyrifos-methyl. The use of synergists in combination with malathion on *T. castaneum* strains and with chlorpyrifos-methyl on the four *O. surinamensis* strains indicated that carboxylesterase was involved in detoxifying malathion in resistant *T. castaneum* adults, whereas oxidases and esterases other than carboxylesterase were involved in detoxifying chlorpyrifos-methyl in tolerant *O. surinamensis* adults. *Journal of economic entomology*. Aug 1989. v. 82 (4). p. 989-995. Includes references. (NAL Call No.: DNAL 421 J822).

0682

### OSHA requirements in commercial grain storage fumigation.

Noyes, R.T. Stillwater, Okla. : The Service. Circular E - Oklahoma State University, Cooperative Extension Service. Paper presented at the 1990 Proceedings, Fumigation Workshop. Jan 1989. (888). p. 60-75. (NAL Call No.: DNAL 275.29 OK41C).

0683

### Periodicity in the behavior of grain beetle larvae (*Tenebrio molitor*).

Sheimann, I.M. Khutzian, S.S.; Ignatovitch, G.S. New York, John Wiley & Sons. Developmental psychobiology. Nov 1980. v. 13 (6). p. 585-590. ill. 12 ref. (NAL Call No.: QP351.D4).

0684

### Persistence and toxicity of chlorpyrifos-methyl in cornmeal.

GENSAB. Highland, H.A. Simonaitis, R.A.; Boatright, R.E. Athens, Ga. : The Society. Journal of Entomological Science. Jan 1985. v. 20 (1). p. 82-86. Includes references. (NAL Call No.: DNAL QL461.G4).

0685

### Pest management of farm-stored grain.

NEUAA. Peters, L.L. Doupenik, B.; Pierce, R. Lincoln, Neb. : The Service. EC - Cooperative Extension Service, University of Nebraska. 1988? . (88-1534). 16 p. Includes references. (NAL Call No.: DNAL 275.29 N272EX).

0686

### Pest management principles for the commercial applicator fumigation pest control /John Wedberg ... et al. .

Wedberg, J. L. Madison, WI : University of Wisconsin-Extension, 1988 . Abstract: Training manual for commercial pesticide applicators in the fumigation pest-control category. Major topics: fumigants; methods of fumigation; principles of insect control; calibration; stored grain fumigation; toxicity of pesticides; protecting human health and the environment; disposal; and label information. Includes study guide of multiple choice questions and answers. March 1988. 1 v. (various pagings) ; ill. ; 30 cm. Bibliography: p. 116 (Appendix A). (NAL Call No.: DNAL SB955.F82 1988).

0687

### Pest of stored peanuts: toxicity and persistence of chlorpyrifos-methyl.

JEENAI. Arthur, F. Lanham, Md. : Entomological Society of America. Virginia type peanuts were treated with 5, 10, 20, and 30 ppm chlorpyrifos-methyl and infested with fifth-instar almond moth, *Cadra cautella* (Walker), and Indianmeal moth, *Plodia interpunctella* (Hubner) at T1, T60, T120, and T180 (days after application). Rates of 5 and 10 ppm did not kill almond moth larvae at T1, and rates of 20 and 30 ppm were only marginally effective. Indianmeal moth larvae were more susceptible to chlorpyrifosmethyl than were almond moth larvae, but only the 20 and 30 ppm rates gave control at T1. Adult red flour beetles, *Tribolium castaneum* (Herbst), and merchant grain beetles, *Oryzaephilus mercator* (Fauvel), were also tested at T1, T60, T120, T180, and T270. Rates of 20 and 30 ppm were effective against both beetle species for at least 180 d after application. *Journal of economic entomology*. Apr 1989. v. 82 (2). p. 660-664. Includes references. (NAL Call No.: DNAL 421 J822).

0688

### Pesticide resistance in *Tribolium castaneum* (Coleoptera: Tenebrionidae) and *Rhyzopertha dominica* (Coleoptera: Bostrichidae) in wheat.

JEENAI. Zettler, J.L. Cuperus, G.W. Lanham, Md. : Entomological Society of America. Eight strain of red flour beetle, *Tribolium castaneum*(Herbst), and 21 of the lesser grain borer, *Rhyzopertha dominica* (F.), collected fromwheat stored on farms in Oklahoma were tested for resistance to malathion, chlorpyrifos-methyl, and phosphine. Results of discriminating dose tests of the red flour beetleindicated that all strains were resistant to malathion, one strain was resistant to phosphine, andnone was resistant to chlorpyrifos-methyl. Similar discriminating dose tests for thelesser grain borer indicated that all strains were resistant to malathion, dichlorvos, and to chlorpyrifos-methyl, and 8 of 21 strains were resistant to phosphine.

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Journal of economic entomology. Oct 1990. v. 83 (5). p. 1677-1681. maps. Includes references. (NAL Call No.: DNAL 421 J822).

0689

**Phenotypic variants and total alpha-amylase activity in the maize weevil (Coleoptera: Curculionidae).**

JKESA. Baker, J.E. Lum, P.T.M.; Halliday, W.R. Lawrence, Kan. : The Society. Journal of the Kansas Entomological Society. Oct 1989. v. 62 (4). p. 430-434. Includes references. (NAL Call No.: DNAL 420 K13).

0690

**Pheromonal trapping methods for lesser grain borer, *Rhyzopertha dominica* (Coleoptera: Bostrichidae).**

EVETEX. Leos-Martinez, J. Granovsky, T.A.; Williams, H.J.; Vinson, S.B.; Burkholder, W.E. College Park, Md. : Entomological Society of America. Environmental entomology. June 1987. v. 16 (3). p. 747-751. Includes references. (NAL Call No.: DNAL QL461.E532).

0691

**Phosphine fumigation of (USA) corn in-transit on a (Polish) bulk-dry cargo ship (for storage pest control).**

Gillenwater, H.B. Redlinger, L.M.; Zettler, J.L.; Davis, R.; McDonald, L.L.; Zehner, J.M. Athens, Ga. : The Society. Journal of the Georgia Entomological Society. Oct 1981. v. 16 (4). p. 462-475. ill. 4 ref. (NAL Call No.: QL461.G4).

0692

**Pirimiphos-methyl as a protectant for high moisture stored wheat (in controlling insects).** Quinlan, J.K. AR-NC. Wilson, J.L.; Davidson, L.I. Lawrence, Kan., The Society. Journal of the Kansas Entomological Society. Oct 1980. v. 53 (4). p. 825-832. ill. 14 ref. (NAL Call No.: 420 K13).

0693

**Potential of ionizing radiation for insect control in the cereal food industry.**

Watters, F.L. St. Paul, Minn. : American Association of Cereal Chemists, c1984. Insect management for food storage and processing / edited by Fred J. Baur. Literature review. p. 267-278. Includes references. (NAL Call No.: DNAL SB937.I49).

0694

**Practical fumigation considerations.** Cuperus, G.W. Noyes, R.T.; Criswell, J. Stillwater, Okla. : The Service. Circular E - Oklahoma State University, Cooperative Extension Service. Paper presented at the 1990 Proceedings, Fumigation Workshop. Jan 1989. (888). p. 3-24. ill. Includes references. (NAL Call No.: DNAL 275.29 OK41C).

0695

**Pre-harvest spray of malathion and DDVP for controlling the insect infestation of stored grains (*Sitophilus oryzae*, *Rhyzopertha dominica*, *Sitotroga cerealella*).**

Singh, K. London, McDonald Publications. International pest control. May/June 1979. v. 21 (3). p. 66-67. ill. 4 ref. (NAL Call No.: 79.8 P432).

0696

**Predictability of stored-wheat insect population trends from life history traits.**

EVETEX. Hagstrum, D.W. Throne, J.E. Lanham, Md. : Entomological Society of America. The extent of which the relationship between environmental factors (temperature and grain moisture content) and life history traits can predict insect population trends in stored wheat was investigated by comparing nine measured population trends with predictions from population dynamics simulation models. Regression of measured against predicted insect population densities indicated that the predictions of the simulation model explained 87, 93, and 96% of the changes in the mean measured densities of *Cryptolestes ferrugineus* (Stephens), *Rhyzopertha dominica* F., and *Tribolium castaneum* (Herbst), respectively. Thus, for the population trends of the three species presented here only, 13, 7, and 4% of the changes in mean measured population densities remains to be explained by other factors. Environmental entomology. Aug 1989. v. 18 (4). p. 660-664. Includes references. (NAL Call No.: DNAL QL461.E532).

0697

**Preliminary evaluation of trimethacarb as a wheat protectant against four species of stored-product insects.**

JESCEP. Halliday, W.R. Tifton, Ga. : The Entomological Science Society. Journal of Entomological Science. Apr 1987. v. 22 (2). p. 126-130. Includes references. (NAL Call No.: DNAL QL461.G4).

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0698

Preliminary infectivity tests using six bacterial formulations against the red flour beetle, *Tribolium castaneum*. JIVPA. Kumari, S.M. Neelgund, Y.F. New York, N.Y. : Academic Press. Journal of invertebrate pathology. Sept 1985. v. 46 (2). p. 198-199. (NAL Call No.: DNAL 421 J826).

0699

A preliminary study with malathion aerosols applied with a corn drying system for the control of insects (*Tribolium castaneum*, *Sitophilus oryzae*). Quinlan, J.K. AR-NC. Athens, Ga., The Society. Journal of the Georgia Entomological Society. July 1980. v. 15 (3). p. 252-257. ill. 5 ref. (NAL Call No.: QL461.G4).

0700

Presence of four species of stored-product moths in storage and field situations in north-central Florida as determined with sex pheromone-baited traps. FETMA. Vick, K.W. Coffelt, J.A.; Weaver, W.A. Gainesville, Fla. : Florida Entomological Society. Florida entomologist. Dec 1987. v. 70 (4). p. 488-492. ill. Includes references. (NAL Call No.: DNAL 420 F662).

0701

Present use of pest management practices in wheat, corn, and oats stored on the farm (*Zea mays*). Storey, C.L. Sauer, D.B.; Walker, D. College Park, Md. : Entomological Society of America. Journal of economic entomology. June 1984. v. 77 (3). p. 784-788. Includes references. (NAL Call No.: 421 J822).

0702

Prevention best treatment for stored grain insects.

Kantack, B. Brookings, S.D. : The Department. Field facts : soils, insects, diseases, weeds, crops - South Dakota State University. Cooperative Extension Service, Plant Science Department. June 16, 1988. v. 3 (13). p. 3. (NAL Call No.: DNAL S596.7.F44).

0703

Principal stored grain insects of Indiana. Lafayette : The Service. Publication E - Purdue University, Cooperative Extension Service. Aug 1985. (80.rev.). 2 p. ill. (NAL Call No.: DNAL SB844.I6P8).

0704

Principles, problems, progress and potential in host resistance to stored-grain insects. Horber, E. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. Literature review. p. 391-417. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

0705

Proceedings of Symposium on Prevention and Control of Insects in Stored-Food Products, Manhattan, Kansas, April 9-13, 1978 / sponsored by U.S. Grain Marketing Research Laboratory, AR, SEA, USDA ... (et al.). -. AR-NC. (s.l. s.n.) 1979. 375 p. Includes bibliographies. (NAL Call No.: SB937.S95 1978).

0706

Proceedings of the Third International Working Conference on Stored-Product Entomology October 23-28, 1983, Kansas State University, Manhattan, Kansas, USA / sponsored by: Department of Entomology and Department of Grain Science and Industry, Kansas State University, Manhattan, Kansas USA ; in cooperation with U.S. Grain Marketing Research Laboratory Manhattan, Kansas USA. --. Manhattan : Kansas State University, 1984. x, 726, 7 p. : ill., maps ; 28 cm. Includes bibliographies. (NAL Call No.: DNAL SB937.I5 1983).

0707

Production dynamics of cucujolide pheromones and identification of 1-octen-3-ol as a new aggregation pheromone for *Oryzaephilus surinamensis* and *O. mercator* (Coleoptera: Cucujidae). EVETEX. Pierce, A.M. Pierce, H.D. Jr.; Borden, J.H.; Oehlschlager, A.C. Lanham, Md. : Entomological Society of America. Aggregation pheromone production by *Oryzaephilus surinamensis* (L.) and *O. mercator* (Fauvel) was measured as a function of adult age and population density. Porapak Q-captured volatiles were monitored weekly from mixed-sex adults feeding on rolled oats at two different population densities. Macrolide aggregation pheromones (cucujolides) were produced by males of both species by the end of the first week after eclosion and maximum production rates were still maintained more than 3 mo later. For *O. mercator*, the previously identified cucujolides were 3(Z),11(R)-dodecen-11-olide and 3(Z),6(Z),11(R)- dodecadien-11-olide, and for *O. surinamensis*, 3(Z),6(Z),11(R)-dodecadien-11-olide, 3(Z),6(Z)-dodecadienolide, and 5(Z),8(Z),13(R)-tetradecadien-13-olide. *O. surinamensis* less than 1 mo after eclosion

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showed a two- to threefold increase in cucujolide production compared with adults maintained at a fivefold higher population density. In comparison, cucujolide production by young *O. mercator* was less sensitive to the presence of conspecifics. At the lower population density, adults of both species more than 1 mo after eclosion produced almost optically pure (R)-(-)-1-octen-3-ol. Laboratory bioassays in a two-choice, pitfall olfactometer indicated that 1-octen-3-ol alone serves as an aggregation pheromone, and when added to mixtures of cucujolide pheromones, it extends the attractive range of the cucujolides for both *Oryzaephilus* species. Environmental entomology. Oct 1989. v. 18 (5). p. 747-755. Includes references. (NAL Call No.: DNAL QL461.E532).

### 0708

Progeny production and duration of development of rusty grain beetles, *Cryptolestes ferrugineus* (Stephens) (Coleoptera: Cucujidae), on cracked and whole corn. JESCEP. Throne, J.E. Culik, M.P. Tifton, Ga. : The Entomological Science Society. Journal of entomological science. Jan 1989. v. 24 (1). p. 150-155. Includes references. (NAL Call No.: DNAL QL461.G4).

### 0709

Prospects for the use of permethrin dust in the control of pests of stored grains in northern Nigeria. Ayertey, J.N. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. p. 229-241. ill. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

### 0710

Protect stored grain from insects. Curl, T. June 1979. v. 94 (6). Progressive farmer for the West. June 1979. v. 94 (6). p. 23. ill. (NAL Call No.: 6 T311).

### 0711

Protecting rough rice stored in metal farm bins from insect attack (*Sitotroga cerealella*, *Rhyzopertha dominica*). Cogburn, R.R. JEENAI. Calderwood, D.L.; Webb, B.D.; Marchetti, M.A. College Park : Entomological Society of America. Journal of economic entomology. Dec 1983. v. 76 (6). p. 1377-1383. Includes references. (NAL Call No.: 421 J822).

### 0712

Protecting uninfested packages from attack by *Cadra cautella* (Lepidoptera: Pyralidae) with the parasitic wasp *Venturia canescens* (Hymenoptera: Ichneumonidae). JEENAI. Cline, L.D. Press, J.W.; Flaherty, B.R. College Park, Md. : Entomological Society of America. Journal of economic entomology. Apr 1986. v. 79 (2). p. 418-420. Includes references. (NAL Call No.: DNAL 421 J822).

### 0713

Protection of stored wheat from the granary weevil (*Sitophilus granarius*) by vegetable oils. Qi, Y.T. Burkholder, W.E. College Park, Md., Entomological Society of America. Journal of economic entomology. Oct 1981. v. 74 (5). p. 502-505. ill. 8 ref. (NAL Call No.: 421 J822).

### 0714

Purification, partial characterization, and postembryonic levels of amylases from *Sitophilus oryzae* and *Sitophilus granarius*. Baker, J.E. Woo, S.M. New York, N.Y. : Alan R. Liss, Inc. Archives of insect biochemistry and physiology. 1985. v. 2 (4). p. 415-428. ill. Includes 37 references. (NAL Call No.: DNAL QL495.A7).

### 0715

Recovery of two sorghum varieties from sublethal infestations of chinch bug, *Blissus leucopterus leucopterus* (Say) (Hemiptera: Lygaeidae). Ahmad, T.R. Kindler, S.D.; Pruess, K.P. College Park, Md. : Entomological Society of America. Journal of economic entomology. Feb 1984. v. 77 (1). p. 142-150. Includes references. (NAL Call No.: 421 J822).

### 0716

Repellent and feeding deterrent effects of turmeric oil, sweetflag oil, neem oil, and a neem-based insecticide against lesser grain borer (Coleoptera: Bostrichidae). JEENAI. Jilani, G. Saxena, R.C. Lanham, Md. : Entomological Society of America. Repellency of oils of turmeric, Curcuma longa (L.), sweetflag, Acorus calamus (L.), neem, Azadirachta indica A. Juss, or a neem-based insecticide (Margosan-O, Vikwood Botanicals, Sheboygan, Wis.) was monitored against the lesser grain borer, *Rhyzopertha dominica* (F.), for 8 wk. In a choice test, filter paper strips treated with the test materials at 200, 400, or 800 micrograms/cm<sup>2</sup> repelled the insect. Turmeric oil and sweetflag oil were significantly more repellent during the first 2 wk than neem oil and Margosan-O, but thereafter, their repellency decreased more.

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rapidly than that of neem oil or Margosan-O. *R. dominica* adults made significantly fewer and smaller feeding punctures in filter paper disks (7 cm diameter) treated with the test materials at 100, 500, or 1,000 micrograms/cm<sup>2</sup> than in control disks. Because of greater persistence, neem oil and Margosan-O deserve to be evaluated in field trials against storage pests. Journal of economic entomology. Apr 1990. v. 83 (2). p. 629-634. Includes references. (NAL Call No.: DNAL 421 J822).

0717

**Repellent and growth-inhibiting effects of turmeric oil, sweetflag oil, neem oil, and "Margosan-O" on red flour beetle (Coleoptera: Tenebrionidae).**

JEENAI. Jilani, G. Saxena, R.C.; Rueda, B.P. College Park, Md. : Entomological Society of America. Journal of economic entomology. Aug 1988. v. 81 (4). p. 1226-1230. Includes references. (NAL Call No.: DNAL 421 J822).

0718

**Report on the Minnesota stored-grain insect survey.**

Barak, A.V. Minneapolis, The Council. Crop production conference report - Crop Quality Council. Crop Quality Council. 1978. 1978. (45th). p. 59-61. ill. (NAL Call No.: 464.9 N813).

0719

**Reproduction retardant and fumigant properties in essential oils against rice weevil (Coleoptera: Curculionidae) in stored wheat.**  
JEENAI. Singh, D. Siddiqui, M.S.; Sharma, S. Lanham, Md. : Entomological Society of America. Thirty-one naturally occurring essential oils of plant origin (1,000 ppm in acetone) were studied under laboratory conditions for reproduction retardant, fumigant toxicity, and grain protection capability against *Sitophilus oryzae* (L.). The volatile oil obtained from *Pinus longifolia* Roxburgh reduced the population of *S. oryzae* 37.51, 75.21, and 86.82% compared with controls of 30, 60, and 90 d after application, indicating the strong reproduction retardant property of the oil. In contrast, essential oils from *Callicarpa macrophylla* Vahl and *Zanthoxylum alatum* Roxburgh increased the insect population 1.5 and 2 times more than controls in 90 d, respectively; these oils showed significant growth promotion. Only *Mentha citrata* Ehrhart oil showed significant fumigant toxicity when applied to stored wheat grain. However, this effect lasted for only 30 d. *Amomum subulatum* Roxburgh, *Artemisia maritima* L., *Cedrus deodara* (Roxburgh) Loudon, and *Z. alatum* oils (30 d) and *P. longifolia* oil (60 d) protected wheat grains from damage. None of the oils, however, could protect wheat grain from damage throughout the entire study period (90 d). The lowest grain damage was observed when seeds

were treated with *P. longifolia* and *Cymbopogon winterianus* Jowitt oils. Isolation of active principles from these biologically active essential oils may be a new natural source of insect control agents. Journal of economic entomology. June 1989. v. 82 (3). p. 727-733. Includes references. (NAL Call No.: DNAL 421 J822).

0720

**Reproductive biology and communication among grain storage and warehouse beetles (Stored products insect pests).**

Burkholder, W.E. GENSA. Athens : The Society. Journal of the Georgia Entomological Society. Oct 1982. v. 17 (4, suppl. 2). p. 1-10. ill. Includes references. (NAL Call No.: QL461.G4).

0721

**Reproductive inhibition of stored product insects (Coleoptera, Lepidoptera) by Mobil 9087 (Experimental insecticide, wheat).**

Kramer, K.J. McGregor, H.E. Manhattan. Journal Kansas Entomological Society. Apr 1979. v. 52 (2). p. 331-333. ill. 4 ref. (NAL Call No.: 420 K13).

0722

**Reproductive isolating mechanisms in two sibling species of mites (*Acarus siro*, *Acarus farris*) (Acaria: Astigmata) compound found together in stored grain.**

Boczek, J. AESAA. Cross, E.A. College Park : The Society. Annals of the Entomological Society of America. May 1983. v. 76 (3). p. 552-555. Includes references. (NAL Call No.: 420 EN82).

0723

**Residual activity of insect growth regulators against stored-product beetles in grain commodities (*Rhyzopertha dominica*, *Sitophilus oryzae*).**

Mian, L.S. Mulla, M.S. College Park, Entomological Society of America. Journal of economic entomology. Aug 1982. v. 75 (4). p. 599-603. ill. 14 ref. (NAL Call No.: 421 J822).

0724

**Residual effectiveness of emulsion and encapsulated formulations of malathion and fenitrothion against four stored grain beetles (*Sitophilus oryzae*, *Tribolium confusum*, *Tribolium castaneum*, *Rhyzopertha dominica*).**

LaHue, D.W. Kadoum, A. College Park, Entomological Society of America. Journal of economic entomology. Apr 15, 1979. v. 72 (2). p. 234-237. ill. 5 ref. (NAL Call No.: 421 J822).

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0725

**Resistance of dent corn inbred lines to oviposition by the maize weevil.**  
JKESA. Tipping, P.W. Rodriguez, J.G.; Poneleit, C.G.; Legg, D.E. Lawrence, Kan. : The Society. Journal of the Kansas Entomological Society. Jan 1988. v. 61 (1). p. 131-134. Includes references. (NAL Call No.: DNAL 420 K13).

0726

**Resistance of hairy fungus beetle (Coleoptera: Mycetophagidae) to pirimiphos methyl and malathion.**  
JEENAI. Weinzierl, R.A. Porter, R.P. Lanham, Md. : Entomological Society of America. Adult hairy fungus beetles, *Typhaea stecorea* (L.), were collected in Livingston County, Ill., from stored corn treated with pirimiphos methyl. When compared with a susceptible population exposed for 14 d to insecticide residues on corn in laboratory bioassays, the Livingston County population exhibited 38-fold resistance to pirimiphos methyl and 66-fold fold resistance to malathion at the LC50. This is the first report of insecticide resistance in the hairy fungus beetle. A laboratory colony of the red flour beetle, *Tribolium castaneum* (Herbst), showed resistance to malathion but not cross-resistance to pirimiphos methyl. A laboratory colony of the maize weevil, *Sitophilus zeamais* Motschulsky, was susceptible to both insecticides. Journal of economic entomology. Apr 1990. v. 83 (2). p. 325-328. Includes references. (NAL Call No.: DNAL 421 J822).

0727

**Resistance of pearl millet cultivars to *Sitophilus oryzae*, *Sitotroga cerealella*, and *Rhyzopertha dominica*.**  
JEENAI. Seifelnsar, Y.E. Mills, R.B. College Park, Md. : Entomological Society of America. Journal of economic entomology. Feb 1985. v. 78 (1). p. 181-184. Includes references. (NAL Call No.: DNAL 421 J822).

0728

**Resistance of polymer films to penetration by lesser grain borer (*Rhyzopertha dominica*) and description of a device for measuring resistance.**  
Highland, H.A. Wilson, R. College Park, Md., Entomological Society of America. Journal of economic entomology. Feb 1981. v. 74 (1). p. 67-70. 7 ref. (NAL Call No.: 421 J822).

0729

**Resistance of sorghum varieties to *Sitophilus oryzae* and *Sitotroga cerealella*.**  
Fadelmula, A. Horber, E. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. p. 418-434. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

0730

**Resistance to the lesser grain borer in Dawn' and Labelle' varieties of rice.**  
JEENAI. McGaughey, W.H. College Park, Md. : Entomological Society of America. Journal of economic entomology. Aug 1973. v. 66 (4). p. 1005. Includes references. (NAL Call No.: DNAL 421 J822).

0731

**Responses to *Prostephanus truncatus* (Coleoptera: Bostrichidae) and *Tribolium castaneum* (Coleoptera: Tenebrionidae) (pests of stored grain and processed foods) to gamma radiation from  $^{60}\text{Co}$  (cobalt isotope).**  
Adem, E. Uribe, R.M. Ottawa, Entomological Society of Canada. The Canadian entomologist. Oct 1979. v. 111 (10). p. 1111-1114. i11. 8 ref. (NAL Call No.: 421 C16).

0732

**Results of a grain storage study in Idaho.**  
TAAEA. Halderson, J.L. St. Joseph, Mich. : The Society. Transactions of the ASAE - American Society of Agricultural Engineers. Jan/Feb 1985. v. 28 (1). p. 246-250. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

0733

**A review of in-transit shipboard fumigation of grain--methodology, efficacy and safety.**  
Davis, R. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. Literature review. p. 346-356. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

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0734

**Safe storage of small amounts of grains, edible seeds and processed foods.**

Wallen, Stanley E. Kamble, Shripat T.; Gold, Roger E.; Roselle, Robert E.; Walker, Charles E. Document available from: University of Nebraska-Lincoln, Dept. of Agricultural Communications, Lincoln, Nebraska 68583 1983. Describes how to properly store these foods to ensure quality, including types of containers to use and how to destroy or repel insects. 4 p. (NAL Call No.: Document available from source.).(NAL Call No.: G83-642).

0735

**Safety measures in handling stored grain.**

Kramer, J.A. Stillwater, Okla. : The Service. Circular E - Oklahoma State University, Cooperative Extension Service. Paper presented at the 1990 Proceedings, Fumigation Workshop. Jan 1989. (888). p. 53-59. illl. Includes references. (NAL Call No.: DNAL 275.29 OK41C).

0736

**Sampling methods for determining insect population in stored grain /prepared by Stored-Product Insects Branch, Market Quality Research Division.**

Washington, D.C. : U.S. Dept. of Agriculture, Agricultural Marketing Service, 1963. Caption title. 2 p. ; 26 cm. (NAL Call No.: DNAL A280.39 M34Am no.497).

0737

**Sampling statistics and detection or estimation of diverse populations of stored-product insects.**

EVETEX. Hagstrum, D.W. Meagher, R.L.; Smith, L.B. College Park, Md. : Entomological Society of America. Sampling data for a variety of stages and species of insects, sampling devices, locations in the marketing systems, and types of grain fit a single model with narrow confidence limits, indicating that the same sampling statistics might be used with diverse populations of stored-product insects. The progressively faster increase in variance and the progressively slower increase in the fraction of samples with insects as insect population density increased can both be explained by a purely probabilistic increase in the chance of a sample having more than one insect. Environmental entomology. Apr 1988. v. 17 (2). p. 377-380. Includes references. (NAL Call No.: DNAL QL461.E532).

0738

**Sealing of grain storages for use with fumigants and controlled atmospheres.**

Banks, H.J. Ripp, B.E. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. Literature review. p. 375-390. illl. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

0739

**The search for a safe, effective spot fumigant for use in breweries.**

Klimovitz, R.J. Milwaukee, Wis.? : The Association?, 1985? . Proceedings, Barley Insect Conference : January 9, 1985, Minneapolis Plaza Hotel, Minneapolis, Minnesota / sponsored by American Malting Barley Association. p. 11-13. (NAL Call No.: DNAL SB608.B2B2 1985).

0740

**Seasonal flight activity of the maize weevil, *Sitophilus zeamais* Motschulsky (Coleoptera: Curculionidae), and the rice weevil, *S. oryzae* (L.), in South Carolina.**

Throne, J.E. Cline, L.D. Clemson, S.C. : South Carolina Entomological Society. Journal of agricultural entomology. July 1989. v. 6 (3). p. 183-192. maps. Includes references. (NAL Call No.: DNAL SB599.J69).

0741

**Seasonal variation of stored wheat environment and insect populations.**

EVETEX. Hagstrum, D.W. College Park, Md. : Entomological Society of America. Environmental entomology. Feb 1987. v. 16 (1). p. 77-83. illl. Includes references. (NAL Call No.: DNAL QL461.E532).

0742

**SEM observations of rice weevil larvae, *Sitophilus oryzae* (L.) (Coleoptera: Curculionidae).**

JKESA. Speirs, R.D. White, G.D.; Wilson, J.L. Lawrence, Kan. : The Society. Journal of the Kansas Entomological Society. Apr 1986. v. 59 (2). p. 390-394. illl. Includes references. (NAL Call No.: DNAL 420 K13).

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0743

### Sex pheromones of rice moth, *Corcyra cephalonica* Stainton. I. Identification of male pheromone.

JCECD. Zagatti, P. Kunesch, G.; Ramiandrasoa, F.; Malosse, C.; Hall, D.R.; Lester, R.; Nesbitt, B.F. New York, N.Y. : Plenum Press. Journal of chemical ecology. July 1987. v. 13 (7). p. 1561-1573. ill. Includes references. (NAL Call No.: DNAL QD415.A1J6).

0744

### Sex pheromones of rice moth, *Corcyra cephalonica* Stainton. II. Identification and role of female pheromone.

JCECD. Hall, D.R. Cork, A.; Lester, R.; Nesbitt, B.F.; Zagatti, P. New York, N.Y. : Plenum Press. Journal of chemical ecology. July 1987. v. 13 (7). p. 1575-1589. Includes references. (NAL Call No.: DNAL QD415.A1J6).

0745

### Simulations comparing insect species differences in response to wheat storage conditions and management practices.

JEENAI. Hagstrum, D.W. Flinn, P.W. Lanham, Md. : Entomological Society of America. Seasonal changes in the populations of *Cryptolestes ferrugineus* (Stephens), *Oryzaephilus surinamensis* (L.), *Rhyzopertha dominica* (F.), *Sitophilus oryzae* (L.), and *Tribolium castaneum* (Herbst) and differences in their response to pest management programs were compared using validated population-growth-simulation models. The population growth of the five pest species differed in response to temperature and grain moisture conditions during storage, and this partially explains differences among species in their response to management practices. Aerating earlier in the storage season was generally more effective in limiting population growth of *C. ferrugineus* and *O. surinamensis* than the other species. Although fumigation was equally effective against all species, *S. oryzae* was able to grow more rapidly than the others as temperatures decreased in the fall. The internal feeders, *R. dominica* and *S. oryzae*, were much less affected by malathion protectant than the other three external-feeding species. As indicated by these three examples, it would sometimes be advantageous to know which species are present in choosing a management program. Journal of economic entomology. Dec 1990. v. 83 (6). p. 2469-2475. Includes references. (NAL Call No.: DNAL 421 J822).

0746

### Simulations comparing the effectiveness of various stored-grain management practices used to control *Rhyzopertha dominica* (Coleoptera: Bostrichidae).

EVETEX. Flinn, P.W. Hagstrum, D.W. Lanham, Md. : Entomological Society of America. A

simulation model for the population dynamics of *Rhyzopertha dominica* (F.) was used to compare the effectiveness of various stored-wheat management programs in controlling this insect in the United States. Infestations on day 365 were reduced 88 times when wheat was harvested and stored in August instead of June, 34 times by aerating the grain in September instead of November, 20 times by storing grain at 10% instead of 14% moisture content, 18 times by fumigating in August or September instead of July, four times when wheat was stored at 27 degrees C instead of 32 degrees C, and approximately three times when malathion was used as a protectant. The model simulations provide an overview of the relative advantages of various approaches to managing stored-grain insects in various geographic localities. Environmental entomology. June 1990. v. 19 (3). p. 725-729. Includes references. (NAL Call No.: DNAL QL461.E532).

0747

### Some effects of mineral salts in the diet of the mold mite, *Tyrophagus putrescentiae* (Schrank) (Insect pests of stored grain, chemical control).

Boczek, J. Ignatowicz, S.; Davis, R. Athens, Ga. : The Society. Journal of the Georgia Entomological Society. Apr 1984. v. 19 (2). p. 235-248. Includes references. (NAL Call No.: QL461.G4).

0748

### Some effects of selected mineral salts on *Tribolium confusum* Jacquelin deVal (insect pest of stored grain).

Kruk, M.GENSA. Boczek, J.; Davis, R. Athens : The Society. Journal of the Georgia Entomological Society. Jan 1983. v. 18 (1). p. 20-27. Includes references. (NAL Call No.: QL461.G4).

0749

### Some food preferences of *Acarus siro* L. (Acarina: acaridae) (Grain mite).

JEENAI. Pankiewicz-Nowicka, D.GENSA. Boczek, J.; Davis, R. Athens : The Society. Journal of the Georgia Entomological Society. Oct 1982. v. 17 (4). p. 491-495. Includes references. (NAL Call No.: QL461.G4).

0750

### Sorbic acid as a long-term protectant in stored corn.

JEENAI. Dunkel, F.V. Read, N.R. College Park, Md. : Entomological Society of America. Journal of economic entomology. June 1986. v. 79 (3). p. 805-812. ill. Includes references. (NAL Call No.: DNAL 421 J822).

(PROTECTION OF PLANT PRODUCTS - INSECTS)

0751

**Sound detection of stored-product insects that feed inside kernels of grain.**  
JEENAI, Vick, K.W. Webb, J.C.; Weaver, B.A.; Litzkow, C. College Park, Md. : Entomological Society of America. A system for acoustically detecting internal-feeding insect larvae in grain is described. Larvae of the lesser grain borer, *Rhyzopertha dominica* (F.); rice weevil, *Sitophilus oryzae* (L.); and Angoumois grain moth, *Sitotroga cerealella* (Olivier), produced sounds loud enough to be detected 13-19 d after oviposition, depending upon the species. After first detection larvae produced detectable sounds 71-90% of the time until pupation. Infestation rates could be estimated, at least in the range of 1-20 infested kernels per 100 ml of grain where the infestation rate was strongly correlated to number of sounds as counted by a frequency counter. Journal of economic entomology. Oct 1988. v. 81 (5). p. 1489-1493. ill. Includes references. (NAL Call No.: DNAL 421 J822).

0752

**A sound-insulated room suitable for use with an acoustic insect detection system and design parameters for a grain sample holding container.**  
FETMA. Vick, K.W. Webb, J.C.; Hagstrum, D.W.; Weaver, B.A.; Litzkow, C.A. Gainesville, Fla. : Florida Entomological Society. Florida entomologist. Dec 1988. v. 71 (4). p. 478-484. ill. Includes references. (NAL Call No.: DNAL 420 F662).

0753

**Spectral sensitivity and behavioural response of diapause larvae of *Trogoderma granarium* (a serious pest in stored grains).**  
Karnavar, G.K. Trivandrum, India, Association for Advancement of Entomology, Dept. of Zoology, University of Kerala. Entomon. June 1979. v. 4 (2). p. 209-211. ill. 8 ref. (NAL Call No.: QL461.E6).

0754

**Spinoff research (Controlling stored-grain insects with radio frequency energy).**  
Nelson, S.O. NE~AR-SO~AR-NC. Stetson, L.E.; Schalphoff, C.W. Lincoln, The Station. Farm, ranch and home quarterly. Nebraska. Agricultural Experiment Station. Summer 1979. v. 26 (2). p. 5-6. ill. (NAL Call No.: 100 N27N).

0755

**Spores in Dockage and mill fractions of wheat treated with *Bacillus thuringiensis* (Biological control of *Ephestia cautella* and *Plodia interpunctella*).**  
McGaughey, W.H. Dicke, E.B.; Finney, K.F.; Bolte, L.C.; Shogren, M.D. College Park, Md., Entomological Society of America. Journal of economic entomology. Dec 1980. v. 73 (6). p. 775-778. ill. 6 ref. (NAL Call No.: 421 J822).

0756

**Stability and effectiveness of fenitrothion on corn to control stored-product insects.**  
Kirkpatrick, R.L. GENSA. Redlinger, L.M.; Simonaitis, R.A.; Zettler, J.L. Athens : The Society. Journal of the Georgia Entomological Society. July 1983. v. 18 (3). p. 344-350. Includes references. (NAL Call No.: QL461.G4).

0757

**Stability of malathion applied on stored wheat for control of rusty grain beetles (*Cryptolestes ferrugineus*).**  
Watters, F.L. Mensah, G.W.K. College Park, Md., Entomological Society of America. Journal of economic entomology. Oct 1979. v. 72 (5). p. 794-800. ill. 13 ref. (NAL Call No.: 421 J822).

0758

**Status of malathion and pirimiphos-methyl resistance in adults of red flour beetle and sawtoothed grain beetle infesting farm-stored corn in Minnesota.**  
Subramanyam, B. Harein, P.K. Clemson, S.C. : South Carolina Entomological Society. Journal of agricultural entomology. Apr 1990. v. 7 (2). p. 127-136. Includes references. (NAL Call No.: DNAL SB599.J69).

0759

**Status of malathion resistance in five genera of beetles infesting farm-stored corn, wheat, and oats in the United States (*Tribolium castaneum*, *Rhyzopertha dominica*, *Sitophilus* spp., *Cryptolestes* spp., *Oryzaephilus* spp.).**  
Haliscak, J.P. JEENA. Beeman, R.W. College Park : Entomological Society of America. Journal of economic entomology. Aug 1983. v. 76 (4). p. 717-722. maps. Includes references. (NAL Call No.: 421 J822).

(PROTECTION OF PLANT PRODUCTS - INSECTS)

0760

**Storage of cereal grains in nitrogen atmosphere.**  
Shejbal, J. St. Paul, Minn., American Association of Cereal Chemists. Cereal foods world. May 1979. v. 24 (5). p. 192-194. ill. 24 ref. (NAL Call No.: 59.8 C333).

0761

**Storage preparation and chemical insect control.**  
Coppock, S. Cuperus, G. Stillwater, Okla. : The Service. Circular E - Oklahoma State University, Cooperative Extension Service. In series analytic: 1989 Oklahoma grain elevator workshop manual. 1989. (881). 4 p. (NAL Call No.: DNAL 275.29 OK41C).

0762

**Stored grain advisor: A knowledge-based system for management of insect pests of stored grain.**  
Flinn, P.W. Hagstrum, D.W. Moscow, Idaho : AI Applications. AI applications in natural resource management. 1990. v. 4 (3). p. 44-52. ill. Includes references. (NAL Call No.: DNAL QA76.76.E95A5).

0763

**Stored grain bug rules changed.**  
Kantuck, B. Brookings, S.D. : The Department. Field facts : soils, insects, diseases, weeds, crops - South Dakota State University, Cooperative Extension, Plant Science Department. Aug 27, 1987. v. 2 (20). p. 4. (NAL Call No.: DNAL S596.7.F44).

0764

**Stored grain insect control.**  
Johnson, D.R. Jones, B.F. Little Rock, Ark. : The Service. EL - University of Arkansas, Cooperative Extension Service. Feb 1989. (412.rev.). 11 p. ill. (NAL Call No.: DNAL 275.29 AR4LE).

0765

**Stored grain insect control.**  
Roberts, J.E. Sr. Wilcke, W.F. Blacksburg, Va. : Extension Division, Virginia Polytechnic Institute and State University. Publication - Virginia Cooperative Extension Service. In the series analytic: 1988-89 pest management recommendations for field crops. 1989. (456-015). p. 34-38. (NAL Call No.: DNAL S544.3.V8V52).

0766

**Stored grain insect control.**  
Johnson, D.R. Jones, B.F. Little Rock : The Service. MP - University of Arkansas. Cooperative Extension Service. Apr 1983. Apr 1983. (412rev.). 8 p. ill. (NAL Call No.: 275.29 AR4MI).

0767

**Stored grain insect control.**  
Sargent, James E. 1980. This discusses stored grain pests, pre-storage pest prevention, storage prevention, and control of infestations. Document available from: Ext. Office of Information, Ohio State Univ., 2120 Fyffe Road, Columbus, OH 43210. 6 p. (NAL Call No.: Not available at NAL).(NAL Call No.: L153).

0768

**Stored grain insect control /by Donald R. Johnson and Bill F. Jones.**  
Johnson, Donald R. Jones, Bill F. Little Rock, Ark. : Cooperative Extension Service, University of Arkansas, U.S. Dept. of Agriculture, and county governments cooperating, 1987 . Abstract: This leaflet covers stored grain insects, sources of infestation, and five prevention and control strategies including sanitation, preventive spray treatments and fumigation. Features illustrations of immature and adult internal and external feeding insects. Caption title.~ "EL412-7M-9-87RV"--P. 11. 11 p. : ill. ; 23 cm. (NAL Call No.: DNAL 275.29 Ar4Le no.412 1987).

0769

**Stored grain insect control in Oklahoma.**  
Coppock, S.P. Pitts, T. Stillwater : The Service. OSU extension facts - Cooperative Extension Service, Oklahoma State University. Mar 1983. Mar 1983. (7180). 4 p. ill. Includes references. (NAL Call No.: S544.3.0505).

0770

**Stored-grain insect management in Montana.**  
Morrill, W.L. Lohr, K.; Jensen, G. Bozeman, Mont. : The Service. Montguide MT : Agriculture - Montana State University, Cooperative Extension Service. Oct 1985. (8528). 4 p. ill. Includes references. (NAL Call No.: DNAL S544.3.M9M65).

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0771

**Stored-grain insects.**

United States ~ Dept. of Agriculture ~ Science and Education Administration. (Washington) U.S.D.A., Science and Education Administration : for sale by the Supt. of Docs., U.S. Govt. Print. Off. (1979). 57 p. : ill. (part col.) ; 24 cm. --. (NAL Call No.: 1 Ag84Ah No.500 1979).

0772

**Stored-grain insects / prepared by the Agricultural Research Service, United States Department of Agriculture . --.**  
Washington D.C. : The Service ; Springfield, Va. : National Technical Information Service, 1986. Cover title.~ "This handbook supersedes and enlarges Farmers bulletin 1260, "Stored-grain pests"--Prelim. p. 2 .~ Shipping list no.: 86-432-P. 57 p. : ill. (some col.) ; 23 cm. --. (NAL Call No.: DNAL 1 Ag84Ah no.500 1986).

0773

**Stored-grain pests /prepared by the Stored Product Insects Section, Biological Sciences Branch, Agricultural Marketing Service.**  
Washington, D.C. : U.S. Dept. of Agriculture, 1955. 46 p. : ill. ; 23 cm. (NAL Call No.: DNAL 1 Ag84F no.1260 1955).

0774

**Stored products pest control : category 7B / (Dell E. Gates ... et al.). -.**  
Gates, Dell E. & Commercial pesticide applicator certification and recertification study manual. Manhattan Cooperative Extension Service, Kansas State University 1980. Pesticide Applicator Training Collection ~Cover title ~At head of title: Commercial pesticide applicator certification and recertification study manual ~"July 1980. ~S-16. 44 p. : ill. ; 28 cm. Includes bibliographical references. (NAL Call No.: SB937.S7).

0775

**Studies on the distribution and movement of <sup>14</sup>C-malathion in stored wheat.**  
Anderegg, B.N. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. p. 276-285. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

0776

**Suppression of residual populations of the rice weevil, *Sitophilus oryzae*, by the parasitic wasp, *Anisopteromalus calandrae* (Biological control).**

Press, J.W. Cline, L.D.; Flaherty, B.R. Athens : The Society. Journal of the Georgia Entomological Society. Jan 1984. v. 19 (1). p. 110-113. Includes references. (NAL Call No.: QL461.G4).

0777

**Survival and reproduction of two species of stored product beetles (*Ahasverus advena*, the foreign grain beeetle, *Cryptolestes pusillus*, the flat grain beetle) on selected fungi (*Penicillium citrinum*, *Aspergillus amstelodami*, *Cladosporium*).**

Rodriguez, J.G. Potts, M. New York. Journal of invertebrate pathology. Jan 1979. v. 33 (1). p. 115-117. ill. (NAL Call No.: 421 J826).

0778

**Susceptibility of classes of wheat grown in the United States to stored-grain insects.**

JEENAI. McGaughey, W.H. Speirs, R.D.; Martin, C.R. Lanham, Md. : Entomological Society of America. Comparative studies were done on the reproductive rates of *Sitophilus oryzae* (L.) and *Rhyzopertha dominica* (F.) in relation to physical properties of the predominant U.S. varieties of hard red winter, soft red winter, hard red spring, white, and durum wheats. Reproductive rates of both species differed significantly among the classes, and quantitative data were obtained that may be useful in modeling population growth on the different classes. White wheats were most susceptible to both species, but the ranking of the other classes differed between the two species. Within the classes of wheat, virtually no significant differences between varieties in reproductive rates of either species were apparent. Variation between production sites exceeded that between varieties. Kernel size and density were not suitable criteria for distinguishing between the classes and did not correlate well with reproduction by either species. Kernel hardness differed among the classes and correlated well with *S. oryzae* reproduction but not with *R. dominica*. *S. oryzae* appeared to be sensitive to kernel hardness only when differences were quite large, such as between classes. Small differences in hardness between or within varieties within a class had little effect on *S. oryzae* reproduction. Journal of economic entomology. June 1990. v. 83 (3). p. 1122-1127. Includes references. (NAL Call No.: DNAL 421 J822).

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0779

**Susceptibility of malathion-resistant Indianmeal moths, *Plodia interpunctella* (Hubner) (Lepidoptera:Pyralidae), to a granulosis virus (Pest of stored-grain).**  
Mardan, A.H. Harein, P.K. College Park, Md. : Entomological Society of America. Environmental entomology. Feb 1984. v. 13 (1). p. 79-80. Includes references. (NAL Call No.: QL461.E532).

Journal of economic entomology. June 1985. v. 78 (3). p. 511-515. Includes references. (NAL Call No.: DNAL 421 J822).

0780

**Susceptibility of populations of Indianmeal moth (*Plodia interpunctella*) and almond moth (*Ephestia cautella*) to *Bacillus thuringiensis* (Pests of stored grain, biological control).**  
Kinsinger, R.A. McGaughey, W.H. College Park, Md., Entomological Society of America. Journal of economic entomology. June 1979. v. 72 (3). p. 346-349. ill. 12 ref. (NAL Call No.: 421 J822).

0784

**Thermal disinfestation of wheat in a spouted bed.**

Claflin, J.K. Evans, D.E.; Fane, A.G.; Hill, R.J. Manhattan : Kansas State University, 1984. Proceedings of the Third International Working Conference on Stored-Product Entomology : Oct 23-28, 1983, Kansas State Univ., Manhattan, Kansas / spon. Dept. of Entomology and Dept. of Grain Science a. p. 531-537. ill. Includes references. (NAL Call No.: DNAL SB937.I5 1983).

0781

**Susceptibility of various triticale lines to three stored grain insects (*Ephestia cautella*, *Lasiodesma serricornis*, *Tribolium castaneum*).**  
Rathore, Y.S. Sachan, G.C. Hapur, Foodgrain Technologists' Research Association of India. Bulletin of grain technology. Apr 1978. v. 16 (1). p. 34-38. ill. 7 ref. (NAL Call No.: TS2120.B8).

0785

**Three methods of aluminum phosphide application for the in-transit fumigation of grain aboard deep-draft bulk cargo ships.**  
JEENAI. Leesch, J.G. Arthur, F.H.; Davis, R. Lanham, Md. : Entomological Society of America. Three methods of applying aluminum phosphide were tested aboard a deep-draft vessel to determine the suitability of each method for fumigating grain in transit. Results showed that all three methods were highly effective with only low levels of phosphine residues resulting in the wheat. However, the recirculation method provided faster and more even distribution of phosphine throughout the grain mass than did the two passive methods. After a fumigation exposure of 26 d, all insects exposed at positions where concentration X time (C X T) values were > 1.0 were killed. As tested in this study, all three methods posed no hazards to the ship's crew or to dock workers unloading the cargo at destination. Journal of economic entomology. Aug 1990. v. 83 (4). p. 1459-1467. Includes references. (NAL Call No.: DNAL 421 J822).

0782

**Synthetic pheromone 5-hydroxy-4-methyl-3-heptanone and its use in controlling grain weevils.**  
Burkholder, W.E. Phillips, J.K.; Walgenbach, C.A.; Klein, J.A. Washington, D.C. : The Department. Abstract: The compound 5-hydroxy-4-methyl-3-heptanone (sitophilure) has been identified as an aggregation pheromone for both males and females of grain weevils belonging to the genus *sitophilus*. The compound and compositions containing the same are useful tools for the monitoring and control of these major agricultural pests of stored grain. United States Department of Agriculture patents. Copies of USDA patents are available for a fee from the Commissioner of Patents and Trademarks, U.S. Patents and Trademarks Office, Washington, D.C. 20231. Apr 22, 1986. (4,584,193). 1 p. Includes references. (NAL Call No.: DNAL aT223.V4A4).

0786

**Translocation of malathion, bromophos, and iodofenphos into stored grain from treated structural surfaces (Bioassay with *Cryptolestes ferrugineus* and *Tribolium castaneum*).**

Mensah, G.W.K. Watters, F.L. College Park, Md., Entomological Society of America. Journal of economic entomology. June 1979. v. 72 (3). p. 385-391. ill. 22 ref. (NAL Call No.: 421 J822).

0783

**Testing for malathion resistance in field-collected populations of *Cryptolestes ferrugineus* (Stephens) and factors affecting reliability of the tests.**  
JEENAI. White, N.D.G. Loschiavo, S.R. College Park, Md. : Entomological Society of America.

0787

**The transovarial transmission of symbionts in the grain weevil, *Sitophilus granarius*.**  
Al-Khalifa, M.S. New York, N.Y. : Academic Press. Journal of invertebrate pathology. July 1984. v. 44 (1). p. 106-108. ill. Includes references. (NAL Call No.: 421 J826).

(PROTECTION OF PLANT PRODUCTS - INSECTS)

0788

Trap detection of stored-grain insects in farm-stored, shelled corn.  
Barak, A.V. Harein, P.K. College Park, Md., Entomological Society of America. Journal of economic entomology. Feb 1982. v. 75 (1). p. 108-111. ill. 1 p. ref. (NAL Call No.: 421 J822).

0789

U.S. wheat-marketing system: an insect ecosystem.

Hagstrum, D.W. Heid, W.G. Jr. College Park, Md. : The Society. Bulletin of the Entomological Society of America. Spring 1988. v. 34 (1). p. 33-36. Includes references. (NAL Call No.: DNAL 423.9 EN8).

0790

Ultra-low-volume applications of synergized pyrethrins for stored-product insect control (Flour beetle, *Tribolium confusum*, and rice weevil, *Sitophilus oryzae*).

Bernhard, K.M. Bennett, G.W. College Park, Md., Entomological Society of America. Journal of economic entomology. Oct 1981. v. 74 (5). p. 572-576. ill. 12 ref. (NAL Call No.: 421 J822).

0791

Understanding some insect pests of cereal grains...Hessian fly.

Morrill, W.L. Bozeman : The Station. Capsule information series - Montana Agricultural Experiment Station. June 1983. June 1983. (31). 2 p. ill. (NAL Call No.: S83.M6).

0792

A unique fly problem in an industrial bio-filter system (*Desmometopa varipalpus* infesting a corn processing plant).

Williams, R.E. Walker, G.L. New York, Harcourt Brace Jovanovich. Pest control. July 1981. v. 49 (7). p. 14, 16, 58. ill. 1 ref. (NAL Call No.: 449.8 EX8).

0793

Unique virus morphogenesis and cytopathology of a Baculovirus (hypertrophy strain) in larva of the armyworm, *Pseudaletia unipuncta* (Grain and product pest, biological control).

Tanada, Y.JIVPA. Hess, R.T.; Omi, E.M. New York : Academic Press. Journal of invertebrate pathology. Sept 1982. v. 40 (2). p. 197-204. ill. Includes references. (NAL Call No.: 421 J826).

0794

Unpredictable penalties at time of sale applied to insect-infested, farm-stored grain in Minnesota (Laws).

Barak, A.V. Harein, P.K. College Park, Md., The Society. Bulletin of the Entomological Society of America. Sept 1981. v. 27 (3). p. 166-169. ill. Includes 8 ref. (NAL Call No.: 423.9 EN8).

0795

Update on stored grain insect problems and control.

Harein, P.K. Minneapolis, The Council. Crop production conference report - Crop Quality Council. 1980. 1980. (47th). p. 46-48. (NAL Call No.: 464.9 N813).

0796

Update on the use and status of methyl bromide for barley insect control.

White, L.V. Milwaukee, Wis.? : The Association?, 1985? . Proceedings, Barley Insect Conference : January 9, 1985, Minneapolis Plaza Hotel, Minneapolis, Minnesota / sponsored by American Malting Barley Association. p. 7-8. (NAL Call No.: DNAL SB608.B2B2 1985).

0797

Update on the use and status of phosphine products for barley insect control.

Wilbur, D.A. Milwaukee, Wis.? : The Association?, 1985? . Proceedings, Barley Insect Conference : January 9, 1985, Minneapolis Plaza Hotel, Minneapolis, Minnesota / sponsored by American Malting Barley Association. p. 9-10. (NAL Call No.: DNAL SB608.B2B2 1985).

0798

Uptake of bromophos into bulk stored wheat from treated granary surfaces (Rusty grain beetle, *Cryptolestes ferrugineus*).

Mensah, G.W.K. Watters, F.L. College Park, Entomological Society of America. Journal of economic entomology. Apr 15, 1979. v. 72 (2). p. 275-276. ill. 8 ref. (NAL Call No.: 421 J822).

0799

The use of aeration spears for cooling infested grain (*Oryzaephilus surinamensis*, storage insects).

Armitage, D.M. Burrell, N.J. Oxford. Journal of stored products research. Dec 1978. v. 14 (4). p. 223-226. ill. 5 ref. (NAL Call No.: 421 J829).

# (PROTECTION OF PLANT PRODUCTS - INSECTS)

0800

**Use of perforated tubing to distribute phosphine during the in-transit fumigation of wheat.**

JEENAI. Leesch, J.G. Davis, R.; Zettler, J.L.; Sukkestad, D.R.; Zehner, J.M.; Redlinger, L.M. College Park, Md. : Entomological Society of America. Journal of economic entomology. Dec 1986. v. 79 (6). p. 1583-1589. ill. Includes references. (NAL Call No.: DNAL 421 J822).

0801

**The use of thermocouples in grain management.** Kuhlman, Dennis K. Holmes, Elwyn S. & Energy facts. Document available from: Kansas State University, Distribution Center, Umberger Hall, Manhattan, Kansas 66506 1979. Discusses the use of thermocouples to prevent grain losses due to molds, bacteria, mites and other insects. 4 p. : ill. (NAL Call No.: Document available from source.).(NAL Call No.: MF-448).

0802

**Ventilation concepts for insect control in grain storage and agricultural warehousing.** Beard, J.T. Arthur, J.H. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1985 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1985. (fiche no. 85-3517). 20 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

0803

**Wheat tetrameric inhibitors of insect alpha-amylases: allopolloid heterosis at the molecular level.**

PNASA. Gomez, L. Sanchez-Monge, R.; Garcia-Olmedo, F.; Salcedo, G. Washington, D.C. : The Academy. Proceedings of the National Academy of Sciences of the United States of America. May 1989. v. 86 (9). p. 3242-3246. ill. Includes references. (NAL Call No.: DNAL 500 N21P).

0804

**Worker protection and safety.**

Waddie, G. Stillwater, Okla. : The Service. Circular E - Oklahoma State University, Cooperative Extension Service. In series analytic: 1989 Oklahoma grain elevator workshop manual. 1989. (881). 5 p. (NAL Call No.: ONAL 275.29 OK41C).

0805

**World collection rice varieties: resistance in rice seed to the Angoumois grain moth.** Cogburn, R.R. Russell, M.P. College Station, Tex. : The Texas Agricultural Experiment Station, The Texas A&M University System. Proceedings - Rice Technical Working Group. Meeting held March 12-14, 1974, Fayetteville, Arkansas.~ Includes abstract. 1974. (15th). p. 29. (NAL Call No.: DNAL SB191.R5R52).

0806

**1986 insect pest management guide stored grain /prepared by Richard A. Weinzierl.** Weinzierl, Richard A. Urbana, Ill. : University of Illinois at Urbana-Champaign, College of Agriculture, Cooperative Extension Service, 1985. Caption title. 7 p. ; 28 cm. Bibliography: p. 6. (NAL Call No.: DNAL 275.29 I162c no. 1242).

0807

**1988 insect pest management guide stored grain /prepared by Richard A. Weinzierl.** Weinzierl, Richard A. Urbana, Ill. : University of Illinois at Urbana-Champaign, College of Agriculture, Cooperative Extension Service, 1987 . Abstract: This annually revised guide contains insecticide and cultural control recommendations for managing stored-grain insect pests. Integrated pest management (IPM) concepts and applicator certification requirements for applying insecticides and fumigants are discussed. Addresses and telephone numbers of Illinois Poison Resource Centers and sources of additional information are provided. Caption title.~ "November 1987." 7 p. ; 28 cm. Includes bibliographical references (p. 7). (NAL Call No.: ONAL 275.29 I162C no. 1242 1987).

0808

**1988 Oklahoma Grain Elevator Workshops February 2, Chickasha, February 3, Enid, February 4, Woodward /sponsored by Cooperative Extension Service, Division of Agriculture, Oklahoma State University ; in cooperation with Farmers Cooperative Grain Dealers Association of Oklahoma, Oklahoma Grain and Feed Association, Oklahoma Wheat Commission.**

Stillwater, Okla.? : The Service, 1988 . Abstract: This manual is composed of the presentations given at the 1988 Oklahoma Grain Elevator Workshops held February 2-4. Topics covered include overview of grain industry, one year sequence of stored grain management; storage production and chemical insect control; receiving and handling; grain blending; fumigation; integrated pest management; and aeration of commercial grain structures. Grain elevator maintenance guides, inspection checklists and housekeeping reports are provided. Cover title. 1 v. (various pagings) : ill. ; 29 cm. (NAL Call No.: DNAL SB190.04

(PROTECTION OF PLANT PRODUCTS - INSECTS)

1988).

0809

**1990 Proceedings: Fumigation Workshop.**  
Stillwater, Okla. : The Service. Circular E -  
Oklahoma State University, Cooperative  
Extension Service. Jan 1989. (888). 119 p. (NAL  
Call No.: DNAL 275.29 OK41C).

# WEEDS

0810

Longevity of witchweed (*Striga asiatica*) seed  
(Effect of storage conditions on seed  
germination, parasitizes maize, sorghum,  
sugarcane, rice, North Carolina).

Bebawi, F.F. Eplee, R.E.; Harris, C.E.; Norris,  
R.S. Champaign, Ill. : Weed Science Society of  
America. Weed science. July 1984. v. 32 (4). p.  
494-497. Includes 14 references. (NAL Call No.:  
79.8 W41).

# PESTICIDES - GENERAL

0811

Agricultural pest control : farm storage pest control : Texas. -  
College Station, Tex. Texas Agricultural Extension Service, Texas A&M University System (1977). Pesticide Applicator Training Collection ~Cover title ~At head of title: Using pesticides commercial applicator manual ~Reprinted 9-77. 30 p. : ill. ; 28 cm.  
Bibliography: p. 30. (NAL Call No.: SB937.A33).

DNAL 381 J8223).

0812

Analysis of fenitrothion and metabolites in stored wheat.

Abdel-Kader, M.H.K. Webster, G.R.B. New York, N.Y., Gordon and Breach Science Publishers. International journal of environmental analytical chemistry. 1982. v. 11 (2). p. 153-165. 11 ref. (NAL Call No.: QH540.I52).

0813

Bacillus thuringiensis: a critical review.

McGaughey, W.H. Washington, D.C. : The Service. Reprints - U.S. Department of Agriculture, Agricultural Research Service. 1986. 250 . p. 14-23. Includes references. (NAL Call No.: DNAL aS21.A8U5/ARS).

0814

Comparison of fenitrothion and malathion for treatment of plywood and galvanized steel surfaces for control of the red flour beetle (Coleoptera: Tenebrionidae) and the rusty grain beetle (Coleoptera: Cucujidae) (*Tribolium castaneum*, *Cryptolestes ferrugineus*).

White, N.D.G.JEENA. Nowicki, T.W.; Watters, F.L. College Park : Entomological Society of America. Journal of economic entomology. Aug 1983. v. 76 (4). p. 856-863. Includes references. (NAL Call No.: 421 J822).

0815

Comparison of malathion and three candidate protectants against insect pests of stored rice and advantages of encapsulation.

Cogburn, R.R. College Station, Tex., Southwestern Entomological Society. The Southwestern entomologist. Mar 1981. v. 6 (1). p. 38-43. 5 ref. (NAL Call No.: QL461.S65).

0816

Cypermethrin and fenvalerate residues in stored wheat and milled fractions.

JAFCAU. Joia, B.S. Webster, G.R.B.; Loschiavo, S.R. Washington, D.C. : American Chemical Society. Journal of agricultural and food chemistry. July/Aug 1985. v. 33 (4). p. 618-622. Includes references. (NAL Call No.:

0817

Dangers in the air when handling livestock (Silo and manure pit gasses, grain dusts, pesticides, accident prevention).

Aherin, R.A. MN. Eckberg, S.R.; Porte, A.R. St. Paul, Minn., The Service. Extension folder. Minnesota. University. Agricultural Extension Service. 1979. 1979. (500). 5 p. ill. (NAL Call No.: 275.29 M66EX).

0818

Degradation of <sup>14</sup>C (carbon isotope)-malathion in stored corn and wheat inoculated with *Aspergillus glaucus*.

Anderegg, B.N.JEENA. Madisen, L.J. College Park : Entomological Society of America. Journal of economic entomology. Aug 1983. v. 76 (4). p. 733-736. Includes references. (NAL Call No.: 421 J822).

0819

Effect of insecticide distribution and storage time on the degradation of (<sup>14</sup>C (carbon isotope) ) malathion in stored wheat (*Tribolium castaneum*).

Anderegg, B. N.JEENA. Madisen, L.J. College Park : Entomological Society of America. Journal of economic entomology. Oct 1983. v. 76 (5). p. 1009-1013. Includes references. (NAL Call No.: 421 J822).

0820

Effects of malathion dust on Indian meal moth and almond moth (Lepidoptera:Phycitidae) infestation of stored wheat (*Plodia interpunctella*, *Ephestia cautella*).

Madrid, F.J.JEENAI. White, N.D.G.; Sinha, R.N. College Park : Entomological Society of America. Journal of economic entomology. Dec 1983. v. 76 (6). p. 1401-1404. Includes references. (NAL Call No.: 421 J822).

0821

Exit holes by cigarette beetles and lesser grain borers through paper bags treated with permethrin or synergized pyrethrins (*Lasioderma serricorne*, *Rhyzopertha dominica*).

Highland, H.A.GENSA. Athens : The Society. Journal of the Georgia Entomological Society. Jan 1983. v. 18 (1). p. 65-71. Includes references. (NAL Call No.: QL461.G4).

(PESTICIDES - GENERAL)

0822

Fate of herbicide-derived aniline residues during ensilage.

BECTA. Lyons, C.D. Katz, S.E.; Bartha, R. New York, N.Y. : Springer-Verlag. Bulletin of environmental contamination and toxicology. Nov 1985. v. 35 (5). p. 704-710. Includes references. (NAL Call No.: DNAL RA1270.P35A1).

covered. vii, 51, 7 p. : ill. ; 28 cm. Includes bibliographical references. (NAL Call No.: DNAL SB955.F84).

0823

Fumigation.

Stockdale, Harold J. Buntin, Linda A. & Iowa commercial pesticide applicator manual. Document available from: Iowa State University, Publications Distribution, Printing & Publications Bldg., Ames, Iowa 50011 1980. This publication discusses grain bin fumigation, methods, materials, and the necessary equipment to control pests. This can also apply to other storage structures as well. 35 p. : ill. (NAL Call No.: Document available from source.).(NAL Call No.: CS-27).

0827

Gas chromatographic determination of cypermethrin and fenvalerate residues in wheat and milled fractions.

IJEAC. Joia, B.S. Sarna, L.P.; Webster, G.R.B. New York, N.Y. : Gordon and Breach Science Publishers. International journal of environmental analytical chemistry. 1985. v. 21 (3). p. 179-184. Includes 19 references. (NAL Call No.: DNAL QH540.I52).

0824

Fumigation : category 7C / (prepared by Harold J. Stockdale and Linda A. Buntin). -.

Stockdale, Harold J. Buntin, Linda A. & Iowa commercial pesticide applicator manual. Ames, Iowa Cooperative Extension Service, Iowa State University 1980. Pesticide Applicator Training Collection ~Cover title ~At head of title: Iowa commercial pesticide applicator manual ~"September 1980. ~CS-27. 35, (1) p., (1) p. of plates : ill., map, form ; 28 cm. (NAL Call No.: SB955.S72 1980).

0828

Gas chromatographic determination of fumigant residues in stored grains, using isoctane partitioning and dual column packings.

Daft, J.L.JANCA. Arlington : The Association. Journal of the Association of Official Analytical Chemists. Mar 1983. v. 66 (2). p. 228-233. Includes references. (NAL Call No.: 381 AS7).

0825

Fumigation of empty grain drying bins with chloropicrin, phosphine, and liquid fumigant mixtures (*Tribolium castaneum*, *Sitophilus oryzae*).

Quinlan, J.K. McGaughey, W.H. College Park, Md. : Entomological Society of America. Journal of economic entomology. Feb 1983. v. 76 (1). p. 184-187. Includes references. (NAL Call No.: 421 J822).

0829

Grain fumigation and seed treatment training manual. -.

Helena Montana Dept. of Agriculture 1981. Cover title ~Pesticide Applicator Training collection. i, 35, (1) p. : ill. ; 28 cm. (NAL Call No.: SB950.2.M9G7).

0830

Grain fumigation exam : certification and re-certification. -.

(S.I. North Dakota Cooperative Extension Service? 1980?). Caption title ~Pesticide Applicator Training Collection. 4 leaves ; 28 cm. (NAL Call No.: SB955.G7).

0831

Grain fumigation: pesticide bans limit options.

CACBA. Johnson, L.A. Minneapolis, Minn. : Cargill, Inc. Cargill bulletin. Mar 1986. p. 4-5. (NAL Call No.: DNAL 281.8 C19).

0832

Grain pesticidesAmerican Association of Cereal Chemists. ---.

Washington, D.C.? : The Association, 1985. Title from container. 4 videocassettes (362 min.) : sd., col. ; 1/2 in. (NAL Call No.: DNAL Videocassette no.21).

0826

Fumigation pest control training for certification / Jim Hamer ... et al.

Hamer, Jim L. Mississippi State? : Cooperative Extension Service, Mississippi State University, 1985? . Abstract: This is a self-study manual designed for commercial pesticide applicator certification in fumigation pest control. It discusses the nature and effect of fumigants, precautions, protective equipment, and detection, symptoms and emergency treatment for acute poisoning by fumigants. The identification, biology and behavior of Stored Grain Insect Pests is also

(PESTICIDES - GENERAL)

0833

**Grain protectants for insect control--methods and equipment for bulk treatment (Insecticides, storage).**

Quinlan, J.K. Washington, D.C., The Department. Marketing bulletin - United States, Dept. of Agriculture. July 1982. July 1982. (72). 12 p. ill. (NAL Call No.: A280.39 AG8M).

0834

**Inhalation exposure of grain samplers and grain inspectors to carbon tetrachloride.**

ACSMC. Deer, H.M. McJilton, C.E.; Karen, P.K.; Sumner, W. Washington, D.C. : The Society. ACS Symposium series - American Chemical Society. 1985. (273). p. 221-241. Includes 57 references. (NAL Call No.: DNAL QD1.A45).

0835

**Joint effects of temperature and insecticides on mortality and fecundity of *Sitophilus oryzae* (Coleoptera: Curculionidae) in wheat and maize.**  
JEENAI. Thaung, M. Collins, P.J. College Park, Md. : Entomological Society of America. Journal of economic entomology. Aug 1986. v. 79 (4). p. 909-914. Includes references. (NAL Call No.: DNAL 421 J822).

0836

**Low-temperature degradation of malathion in stored wheat.**

Abdel-Kader, M.H.K. Webster, G.R.B.; Loschiavo, S.R.; Watters, F.L. College Park, Md., Entomological Society of America. Journal of economic entomology. Oct 1980. v. 73 (5). p. 654-656. 13 ref. (NAL Call No.: 421 J822).

0837

**Measuring uniformity of coverage in auger application of fungicides.**

TAAEA. Endsley, J.C. Reid, J.F.; Bode, L.E. St. Joseph, Mich. : American Society of Agricultural Engineers. Transactions of the ASAE. Nov/Dec 1989. v. 32 (6). p. 1865-1870. ill. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

0838

**Miscellaneous study materials for commercial applicators / compiled by Ohio Department of Agriculture Laboratories, Division of Plant Industry .**

1959- . Abstract: These commercial applicator study materials include general core information on Ohio pesticide regulations, Poison Control Centers, pesticide safety and toxicity, and groundwater protection, and information pertaining to the control of plant

agricultural, forest, ornamental, turf, vertebrate (bird), structural (termite), public health (mosquito) and stored grain pests, fumigation, seed treatment, and demonstration and research. Cover title.~ Title supplied by cataloger. v. : ill. ; 28 cm. (NAL Call No.: DNAL SB952.863.03M5).

0839

**Neem: the tree insects hate (Margosa, seed extract as an alternative pesticide for protecting crops and stored grains).**

Doria, J.J. Bronx, N.Y., The Garden Society, New York Botanical Garden. Garden (New York). July/Aug 1981. v. 5 (4). p. 8-10. ill. (NAL Call No.: SB403.G3).

0840

**Persistence and toxicity of chlorpyrifos-methyl in cornmeal.**

GENSAB. Highland, H.A. Simonaitis, R.A.; Boatright, R.E. Athens, Ga. : The Society. Journal of Entomological Science. Jan 1985. v. 20 (1). p. 82-86. Includes references. (NAL Call No.: DNAL QL461.G4).

0841

**Pest management principles for the commercial applicator fumigation pest control /John Wedberg ... et al. .**

Wedberg, J. L. Madison, WI : University of Wisconsin-Extension, 1988 . Abstract: Training manual for commercial pesticide applicators in the fumigation pest-control category. Major topics: fumigants; methods of fumigation; principles of insect control; calibration; stored grain fumigation; toxicity of pesticides; protecting human health and the environment; disposal; and label information. Includes study guide of multiple choice questions and answers. March 1988. 1 v. (various pagings) : ill. ; 30 cm. Bibliography: p. 116 (Appendix A). (NAL Call No.: DNAL SB955.F82 1988).

0842

**Pesticide applicator training.**

Bozeman, Mont. : Montana State University, Extension Service, 1990? . Abstract: This private pesticide applicator training packet contains brochures and publications on a variety of topics including pesticide formulations, shelf life, cold weather storage and handling; chemical fires; labeling; safety; safe handling, storage, and disposal; and pesticide poisoning recognition and treatment. Sprayer protective clothing and appliances, sprayer calibration, and maintenance are covered. Information is provided on ticks, aphids, insect pests on cattle and sheep, weed control, water quality and agrichemicals and seed treatment for small grain. Used for 1990

## (PESTICIDES - GENERAL)

training. 1 portfolio : ill. (some col.), map ; 30 cm. (NAL Call No.: DNAL SB950.2.M9P45).

leaves ; 28 cm. (NAL Call No.: SB950.2.M5R433).

0843

**Pesticide applicator training category 7 .**  
West Lafayette, Ind. : Purdue University, 1988-. Abstract: Five manuals cover the six divisions of Pesticide Applicator Training Category 7. Four manuals prepare commercial pesticide applicators for certification. One manual (7bRT) prepares wood destroying organism technicians for registration. This broad category encompasses the identification and control of industrial, institutional, and health related pests, wood destroying pests, stored food, and common household pests. Pesticide selection, labels, safety, protective equipment, application, calibration, fumigation, toxicity and environmental protection are discussed. Cover title. v. : ill. (some col.), maps ; 30 cm. (NAL Call No.: DNAL SB951.P4629).

0847

**Residues of lindane in stored cereals.**

Gupta, H.C.L. Pareek, B.L. Hapur, Foodgrain Technologists' Research Association of India. Bulletin of grain technology. Aug 1978. v. 16 (2). p. 132-134. ill. 7 ref. (NAL Call No.: TS2120.B8).

0848

**Stability and effectiveness of fenitrothion on corn to control stored-product insects.**

Kirkpatrick, R.L. GENSA. Redlinger, L.M.; Simonaitis, R.A.; Zettler, J.L. Athens : The Society. Journal of the Georgia Entomological Society. July 1983. v. 18 (3). p. 344-350. Includes references. (NAL Call No.: QL461.G4).

0844

**Pesticide applicator training private applicator : grower version .**  
West Lafayette, Ind.? : Purdue University, 198-?. Abstract: This training manual for private pesticide applicators growing agricultural commodities contains materials summarizing FIFRA's purpose, federal and state laws pertaining to private applicators of pesticides, distinctions between toxicity and hazard, chronic toxicity, proper pesticide use, storage and disposal guidelines, and liability/potential penalties for pesticide misuse/spills. It covers groundwater contaminants, run-off, controlling spray drift, and protecting honey bees. Major topics are corn rootworm management by granular soil insecticides and perennial weed control by Roundup. Restricted use pesticide specimen labels and calibration charts are included. Cover title. 1 v. (various pagings) : ill. (some col.) ; 30 cm. (NAL Call No.: DNAL SB951.P4636).

0849

**Status of malathion resistance in five genera of beetles infesting farm-stored corn, wheat, and oats in the United States (*Tribolium castaneum*, *Rhyzopertha dominica*, *Sitophilus spp.*, *Cryptolestes spp.*, *Oryzaephilus spp.*).**  
Haliscak, J.P. JEENA. Beeman, R.W. College Park : Entomological Society of America. Journal of economic entomology. Aug 1983. v. 76 (4). p. 717-722. maps. Includes references. (NAL Call No.: 421 J822).

0845

**Phosphine (fumigant) sorption and desorption by stored wheat and corn.**  
Dumas, T. Washington, D.C., American Chemical Society. Journal of agricultural and food chemistry. Mar/Apr 1980. v. 28 (2). p. 337-339. ill. 9 ref. (NAL Call No.: 381 J8223).

0850

**Stored products pest control : category 7B / (Dell E. Gates ... et al.). -.**  
Gates, Dell E. & Commercial pesticide applicator certification and recertification study manual. Manhattan Cooperative Extension Service, Kansas State University 1980. Pesticide Applicator Training Collection ~Cover title ~At head of title: Commercial pesticide applicator certification and recertification study manual ~"July 1980. ~S-16. 44 p. : ill. ; 28 cm. Includes bibliographical references. (NAL Call No.: SB937.S7).

0846

**Recertification manual for private pesticide applicators : grain fumigation / by Michigan Department of Agriculture, Plant Industry Division. -.**

(S.I.) The Dept. (1982?). Cover title  
~Pesticide Applicator Training collection. 4

0851

**Susceptibility of malathion-resistant Indianmeal moths, *Plodia interpunctella* (Hubner) (Lepidoptera:Pyralidae), to a granulosis virus (Pest of stored-grain).**  
Mardan, A.H. Harein, P.K. College Park, Md. : Entomological Society of America. Environmental entomology. Feb 1984. v. 13 (1). p. 79-80. Includes references. (NAL Call No.: QL461.E532).

(PESTICIDES - GENERAL)

0852

1982 stored grain pest management conference :  
December 9-10, Earle Brown Center, St. Paul  
campus. -.

(St. Paul, Minn.) Agricultural Extension  
Service, University of Minnesota (1982). Cover  
title ~Pesticide Applicator Training collection  
~Includes leaflets and pamphlets. 1 v.  
(loose-leaf) : ill. ; 30 cm. Includes  
bibliographical references. (NAL Call No.:  
SB190.S76 1982).

ill. ; 29 cm. (NAL Call No.: DNAL SB190.04  
1988).

0853

1986 insect pest management guide stored grain  
/prepared by Richard A. Weinzierl.  
Weinzierl, Richard A. Urbana, Ill. : University  
of Illinois at Urbana-Champaign, College of  
Agriculture, Cooperative Extension Service,  
1985. Caption title. 7 p. ; 28 cm.  
Bibliography: p. 6. (NAL Call No.: DNAL 275.29  
I162c no.1242).

0854

1988 insect pest management guide stored grain  
/prepared by Richard A. Weinzierl.  
Weinzierl, Richard A. Urbana, Ill. :  
University of Illinois at Urbana-Champaign,  
College of Agriculture, Cooperative Extension  
Service, 1987 . Abstract: This annually  
revised guide contains insecticide and cultural  
control recommendations for managing  
stored-grain insect pests. Integrated pest  
management (IPM) concepts and applicator  
certification requirements for applying  
insecticides and fumigants are discussed.  
Addresses and telephone numbers of Illinois  
Poison Resource Centers and sources of  
additional information are provided. Caption  
title.~ "November 1987." . 7 p. ; 28 cm.  
Includes bibliographical references (p. 7).  
(NAL Call No.: DNAL 275.29 I162C no.1242 1987).

0855

1988 Oklahoma Grain Elevator Workshops February  
2, Chickasha, February 3, Enid, February 4,  
Woodward /sponsored by Cooperative Extension  
Service, Division of Agriculture, Oklahoma  
State University ; in cooperation with Farmers  
Cooperative Grain Dealers Association of  
Oklahoma, Oklahoma Grain and Feed Association,  
Oklahoma Wheat Commission.

Stillwater, Okla.? : The Service, 1988 .  
Abstract: This manual is composed of the  
presentations given at the 1988 Oklahoma Grain  
Elevator Workshops held February 2-4. Topics  
covered include overview of grain industry, one  
year sequence of stored grain management;  
storage production and chemical insect control;  
receiving and handling; grain blending;  
fumigation; integrated pest management; and  
aeration of commercial grain structures. Grain  
elevator maintenance guides, inspection  
checklists and housekeeping reports are  
provided. Cover title. 1 v. (various pagings) :

# SOIL CHEMISTRY AND PHYSICS

0858

**Soil moisture storage and depletion by winter wheat under five fallow-crop precipitation patterns in a 10-14 inch precipitation area (Optimum rates of nitrogen fertilization).**  
Henderson, R.L. OR. Bolton, F.E. Corvallis, Or., The Station. Special report - Agricultural Experiment Station, Oregon State University. June 1980. June 1980. (571). p. 92-98. ill. (NAL Call No.: 100 OR3M).

# SOIL FERTILITY - FERTILIZERS

0857

**Kernel breakage and density of normal and opaque-2 maize grain as influenced by irrigation and nitrogen.**

CRPSAY. Kniep, K.R. Mason, S.C. Madison, Wis. : Crop Science Society of America. Grain quality is important to farmers, grain elevators, millers, and domestic and foreign buyers. Excessive broken kernels can reduce the grade of grain, lower the selling price farmers receive, decrease production from dry and wet milling processes, reduce artificial drying efficiency, and increase potential dust hazards. However, little attention has been focused on the influence of production practices on grain quality. This study was conducted to determine whether irrigation and soil N levels would affect the quality of maize (*Zea mays L.*) grain. Two water regimes and five N fertilization levels ranging from zero to 360 kg ha<sup>-1</sup> were applied to two normal and two opaque-2 hybrids. The experimental site was a Sharpsburg silty clay loam (fine, montmorillonitic, mesic, Typic Argiudoll) near Mead, NE. Opaque-2 grain was 2.4 times more susceptible to breakage, and 8% lower in density than normal grain. Irrigation increased kernel breakage susceptibility (KBS) from 13.5 to 17.9, 3.2 to 3.8, and 5.4 to 7.3% in 1985, 1986, and 1987, respectively. Increasing soil N levels decreased KBS for all hybrids. Kernel density (KD) of opaque-2 grain was increased with irrigation but decreased with higher N levels. In contrast, KD of normal grain decreased with irrigation but increased with higher N levels. Average grain yields were 9.4, 7.3, and 5.5 Mg ha<sup>-1</sup>, with irrigation increasing yields 28, 9, and 27% over nonirrigation in 1985, 1986, and 1987, respectively. Normal hybrids averaged 5% greater yields than opaque-2 hybrids. Yield increased quadratically with N rate within each moisture regime in each year. Results indicate, production practices influence KBS and KD as well as yield, and may become important considerations in the future. Crop science. Jan/Feb 1989. v. 29 (1). p. 158-163. Includes references. (NAL Call No.: DNAL 64.8 C883).

0858

**Soil moisture storage and depletion by winter wheat under five fallow-crop precipitation patterns in a 10-14 inch precipitation area (Optimum rates of nitrogen fertilization).**

Henderson, R.L. OR. Bolton, F.E. Corvallis, Or., The Station. Special report - Agricultural Experiment Station, Oregon State University. June 1980. June 1980. (571). p. 92-98. iii. (NAL Call No.: 100 OR3M).

# ENTOMOLOGY RELATED

0859

**Aggregation pheromone of square-necked grain beetle, *Cathartus quadricollis* (Guer.).**  
JCECD. Pierce, H.D. Jr. Pierce, A.M.; Johnston, B.D.; Oehlschlager, A.C.; Borden, J.H. New York, N.Y. : Plenum Press. Journal of chemical ecology. Dec 1988. v. 14 (12). p. 2169-2184. Includes references. (NAL Call No.: DNAL QD415.A1J6).

0860

**Bacillus thuringiensis: a critical review.**  
McGaughey, W.H. Washington, D.C. : The Service. Reprints - U.S. Department of Agriculture, Agricultural Research Service. 1986. 250 . p. 14-23. Includes references. (NAL Call No.: DNAL aS21.A8U5/ARS).

0861

**Chemical communication in cucujid grain beetles.**  
JCECD. Oehlschlager, A.C. Pierce, A.M.; Pierce, H.D. Jr.; Borden, J.H. New York, N.Y. : Plenum Press. Journal of chemical ecology. Nov 1988. v. 14 (11). p. 2071-2098. ill. Includes references. (NAL Call No.: DNAL QD415.A1J6).

0862

**Chirality of macrolide pheromones of grain beetles in the genera *Oryzaephilus* and *Cryptolestes* and its implications for species specificity.**  
JCECD. Oehlschlager, A.C. King, G.G.S.; Pierce, H.D. Jr.; Pierce, A.M.; Slessor, K.N.; Millar, J.G.; Borden, J.H. New York, N.Y. : Plenum Press. Journal of chemical ecology. June 1987. v. 13 (6). p. 1543-1554. Includes references. (NAL Call No.: DNAL QD415.A1J6).

0863

**Dominicalure 1 and 2: components of aggregation pheromone from male lesser grain borer *Rhyzopertha dominica* (F.) (Coleoptera: Bostrichidae) (Pests of stored products).**  
Williams, H.J. Silverstein, R.M.; Burkholder, W.E.; Khorramshahi, A. New York, Plenum Press. Journal of chemical ecology. July 1981. v. 7 (4). p. 759-780. ill. 12 ref. (NAL Call No.: QD415.A1J6).

0864

**Effects of two insect growth regulators (hydroprene and R-20458) on the follicular epithelium and the oocytes of the rice weevil, *Sitophilus oryzae* (L.) (Coleoptera: Curculionidae) (Genetic control of stored product pests, morphology).**  
Mkhize, J.M. NYEA. Gupta, A.P. Lawrence : The

Society. Journal of the New York Entomological Society. Sept 1982. v. 90 (3). p. 213-218. ill. 2 p. ref. (NAL Call No.: 420 N48J).

0865

**First record of *Cryptolestes dybasi* (Coleoptera: Cucujidae) outside Florida.**  
ETMNA6. Throne, J.E. Cline, L.D.; Thomas, M.C. Philadelphia, Pa. : American Entomological Society. Entomological news. Mar/Apr 1989. v. 100 (2). p. 81-82. Includes references. (NAL Call No.: DNAL 421 EN88).

0866

**Genetic analysis of fenitrothion resistance in the sawtoothed grain beetle, *Oryzaephilus surinamensis* (Coleoptera: Cucujidae).**  
JEENAI. Collins, P.J. College Park, Md. : Entomological Society of America. Journal of economic entomology. Oct 1986. v. 79 (5). p. 1196-1199. Includes references. (NAL Call No.: DNAL 421 J822).

0867

**Grain fumigation and seed treatment training manual. -.**  
Helena Montana Dept. of Agriculture 1981. Cover title ~Pesticide Applicator Training collection. i, 35, (1) p. : ill. ; 28 cm. (NAL Call No.: SB950.2.M9G7).

0868

**Insect control in farm-stored grain Charles L. Storey, Roy D. Speirs, and Lyman S. Henderson .--.**  
Storeyk, Charles L., 1930-. Washington, D.C. : U.S. Dept. of Agriculture, Science and Education Administration, 1979. 18 p. : ill., map --. (NAL Call No.: DNAL Fiche S-70 no.2269).

0869

**Insect succession in a stored-corn ecosystem in southeast Georgia.**  
AESAAI. Arbogast, R.T. Mullen, M.A. Lanham, Md. : The Society. Annals of the Entomological Society of America. Nov 1988. v. 81 (6). p. 899-912. ill. Includes references. (NAL Call No.: DNAL 420 EN82).

(ENTOMOLOGY RELATED)

0870

**Isolation and identification of two macrolide pheromones from the frass of *Cryptolestes ferrugineus* (Coleoptera: Cucujidae) (Rusty grain beetle, pest of stored food products, (E,E)-4,8-dimethyl-4,8-decadien-10-olide (I), (3Z,11S)-3-dodecen-11-olide (II)).**  
Wong, J.W. JCECD. Verigin, V.; Oehlschlager, A.C.; Borden, J.H.; Pierce, H.D. Jr. New York : Plenum Press. Journal of chemical ecology. Apr 1983. v. 9 (4). p. 451-474. Includes references. (NAL Call No.: QD415.A1J6).

0871

**Macrolide (cucujolide) biosynthesis in the rusty grain beetle, *Cryptolestes ferrugineus* I.**  
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**Stored-grain pests /prepared by the Stored Product Insects Section, Biological Sciences Branch, Agricultural Marketing Service.**  
Washington, D.C. : U.S. Dept. of Agriculture, 1955. 46 p. ; ill. ; 23 cm. (NAL Call No.: DNAL 1 Ag84F no. 1260 1955).

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McNeill, S.G. Overhults, D.G.; Cromwell, G.L.; Stahly, T.S.; Parker, G.R. Lexington, Ky. : The Station. Progress report - Kentucky Agricultural Experiment Station. Documents available from Agriculture Library, Agriculture Science Center - North, University of Kentucky, Lexington, KY 40546-0091. In the series analytic: 1983 swine research report.~ Includes statistical data. Nov 1983. (274). p. 85-86. ill. (NAL Call No.: DNAL 100 K41PR).

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JEENAI. Collins, P.J. College Park, Md. :  
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0884

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0886

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Landolt, P.J. Curtis, C.E. Lawrence, Kan., The Society. Journal of the Kansas Entomological Society. Apr 1982. v. 55 (2). p. 248-252. ill. Includes 9 ref. (NAL Call No.: 420 K13).

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0890

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epithelium and the oocytes of the rice weevil,  
*Sitophilus oryzae* (L.) (Coleoptera:  
Curculionidae) (Genetic control of stored  
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Dahlquist, J. Mader, T.; Krause, V. Lincoln, Neb. : The Station. MP - University of Nebraska, Agricultural Experiment Station. 1989. (54). p. 51-53. (NAL Call No.: DNAL 100 N27M).

0896

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Owen, Foster. Guyer, Paul Q. & Nebguide. 1981. This publication discusses silage with corn and sorghum being the most popular. Forage moisture, chop length, animal response, silo affects, and energy needed for fine chops are covered. Document available from: University of Nebraska-Lincoln, Dept. of Agricultural Communications, Lincoln, Nebraska 68583. 1 sheet. (NAL Call No.: Not available at NAL).(NAL Call No.: G81-568).

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# ANIMAL PHYSIOLOGY AND BIOCHEMISTRY

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Includes references. (NAL Call No.: DNAL QD415.A1J6).

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0906

**Chirality of macrolide pheromones of grain beetles in the genera *Oryzaephilus* and *Cryptoolestes* and its implications for species specificity.**  
JCECD. Oehlschlager, A.C. King, G.G.S.; Pierce, H.D. Jr.; Pierce, A.M.; Slessor, K.N.; Millar, J.G.; Borden, J.H. New York, N.Y. : Plenum Press. Journal of chemical ecology. June 1987. v. 13 (6). p. 1543-1554. Includes references. (NAL Call No.: DNAL QD415.A1J6).

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Includes references. (NAL Call No.: DNAL QL495.A1I57).

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**Sex pheromones of rice moth, *Corypha cephalonica* Stainton. I. Identification of male pheromone.**  
JCECD. Zagatti, P. Kunesch, G.; Ramiandrasoa, F.; Malosse, C.; Hall, D.R.; Lester, R.; Nesbitt, B.F. New York, N.Y. : Plenum Press. Journal of chemical ecology. July 1987. v. 13 (7). p. 1561-1573. illl. Includes references. (NAL Call No.: DNAL QD415.A1J6).

# ANIMAL TAXONOMY AND GEOGRAPHY

0909

**First record of *Cryptolestes dybasi*  
(Coleoptera: Cucujidae) outside Florida.**  
ETMNA6. Throne, J.E. Cline, L.D.; Thomas, M.C.  
Philadelphia, Pa. : American Entomological  
Society. Entomological news. Mar/Apr 1989. v.  
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0910

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Spilman, T.J. Manhattan : Kansas State  
University, 1984. Proceedings of the Third  
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Stored-Product Entomology : Oct 23-28, 1983,  
Kansas State Univ., Manhattan, Kansas / spon.  
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a. p. 44-53. iii. Includes references. (NAL  
Call No.: DNAL SB937.I5 1983).

# VETERINARY PHARMACOLOGY, TOXICOLOGY AND IMMUNE THERAPEUTIC AGENTS

0911

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Reid, J.F. Baker, J.L.; Vaughan, D.H. St.  
Joseph, Mich. : The Society. Paper - American  
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collection). 1981. Paper presented at the 1981  
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Agricultural Engineers. Available for purchase  
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Engineers, Order Dept., 2950 Niles Road, St.  
Joseph, Michigan 49085. Telephone the Order  
Dept. at (616) 429-0300 for information and  
prices. 1981. (fiche no. 81-3518). 1 microfiche  
: illl. Includes references. (NAL Call No.:  
FICHE S-72).

# PEST OF ANIMALS - INSECTS

0912

**Insect-resistant rice could save food, cut storage costs and boost profits.**  
Haney, R.L. Ames, Iowa : International Association of Milk, Food and Environmental Sanitarians, Inc. Dairy, food and environmental sanitation. Jan 1990. v. 10 (1). p. 10-11. (NAL Call No.: DNAL SF221.D342).

0913

**Ohio insect information.**  
Columbus, Ohio : Cooperative Extension Service, Ohio State University, 198-?-. Abstract:  
These publications provide information on the identification, life cycle, habits, non-chemical and chemical control of insect pests including ornamental and turfgrass, wood destroying, stored grain, and public health pests and moles (insectivores). For homeowners and study material for Ohio commercial applicators. Cover title. v. : ill. ; 28 cm. Includes bibliographical references. (NAL Call No.: DNAL SB934.5.03047).

0914

**Summary of Iowa insect pest control recommendations for 1981.**  
Stockdale, Harold J. Foster, David.; Lewis, Donald R.; Quisenberry, Sharron. Document available from: Iowa State University, Publications Distribution, Printing & Publications Bldg., Ames, Iowa 50011 1981. The information offered in this publication discusses insect control for field crops, forages, small grains, stored grains, livestock, ornamental plants, vegetables, fruits, and household pests. 34 p. : ill. (NAL Call No.: Document available from source.).(NAL Call No.: IC-328).

# ANIMAL DISORDERS - PHYSICAL TRAUMA

0915

## Toxigenicity of *Fusarium proliferatum* and other *Fusarium* species isolated from corn ears in Minnesota.

PHYTAJ. Abbas, H.K. Mirocha, C.J.; Kommedahl, T.; Burnes, P.M.; Meronuck, R.A.; Gunther, R. St. Paul, Minn. : American Phytopathological Society. Eighty-one isolates of *Fusarium* species isolated in 1986 from naturally contaminated ears of corn (*Zea mays L.*) in southern Minnesota were identified as *F. proliferatum* (11 isolates), *F. subglutinans* (23 isolates), *F. graminearum* (20 isolates), *F. moniliforme* (19 isolates), and *F. oxysporum* (eight isolates). When these isolates were single-spored, grown on a sterile rice substrate, and fed to rats, *F. proliferatum* caused hemorrhage (five isolates), diarrhea (one isolate), and death (nine isolates); *F. subglutinans* caused death (eight isolates); *F. graminearum* caused uterine enlargement (14 isolates), hemorrhage (four isolates), and death (nine isolates); *F. moniliforme* caused hemorrhage in various organs (13 isolates), diarrhea (three isolates) and death (16 isolates; and *F. oxysporum* caused hemorrhage (one isolate). All 81 isolates caused rats to gain less than those fed control diets. This is the first report of *F. proliferatum* causing organ hemorrhage as well as death.

Phytopathology. Sept 1988. v. 78 (9). p. 1258-1260. Includes references. (NAL Call No.: DNAL 464.8 P56).

# PROTECTION OF ANIMAL PRODUCTS - GENERAL AND MISC.

0916

**Prevention of dust explosions in grain elevators : an achievable goal : a task force report. -.**

United States ~ Dept. of Agriculture ~ Office of the Special Coordinator for Grain Elevator Safety and Security. (Washington) Dept. of Agriculture, Office of the Special Coordinator for Grain Elevator Safety and Security 1980. xii, 172 p. : ill., maps ; 26 cm. Bibliography: p. 171-172. (NAL Call No.: aTH4461.U52).

# PROTECTION OF ANIMAL PRODUCTS - INSECTS

0917

Proceedings of the Third International Working Conference on Stored-Product Entomology October 23-28, 1983, Kansas State University, Manhattan, Kansas, USA /sponsored by: Department of Entomology and Department of Grain Science and Industry, Kansas State University, Manhattan, Kansas USA ; in cooperation with U.S. Grain Marketing Research Laboratory Manhattan, Kansas USA. --. Manhattan : Kansas State University, 1984. x, 726, 7 p. : ill., maps ; 28 cm. Includes bibliographies. (NAL Call No.: DNAL SB937.I5 1983).

# NONFOOD AND NONFEED PRODUCTS

0918

**Biological activities of hexane extract of Piper cubeba against rice weevils and cowpea weevils (Coleoptera: Curculionidae).**  
JESCEP. Su. H.C.F. Tifton, Ga. : Georgia Entomological Society. Journal of entomological science. Jan 1990. v. 25 (1). p. 16-20. Includes references. (NAL Call No.: DNAL OL461.G4).

0923

**Proceedings of a workshop on storage, utilization, and nutritional aspects of grain legumes and grains.** /David G. Cummins, editor. Cummins, David G. Athens, GA : University of Georgia, College of Agriculture, Experiment Stations, 1986. ii, 75 p. ; 28 cm. (NAL Call No.: DNAL HD1775.G4G43 no.39).

0919

**Crop storage decision program** written by Paul Ellinger ; revised and converted to the IBM PC by Carlene Roberts. N/A.  
Ellinger, Paul N. Roberts, Carlene. Urbana, Ill. : Illinois Cooperative Extension Service, College of Agriculture, University of Illinois at Urbana-Champaign : Distributed by Office of Computer Coordination, Illinois Cooperative Extension Service, c1984. Title from title screen.~ IlliNet no. AECO-B-103.~ Starting instructions are for IBM PC, XT and AT, dated 10/86.~ Entry word is on label. 1 computer disk ; 5 1/4 in. + 1 user's guide + 3 starting instructions. (NAL Call No.: DNAL OA76.8.I2594E4).

0920

**Energy conservation in grain (corn) drying with combination high-temperature, low-temperature methods** / R. Vance Morey ... (et al.). -. Morey, R. Vance. (Washington, D.C.?) U.S. Dept. of Energy 1980. Final report, July 1, 1978-December 31, 1979; work performed under Contract no. AS02-78CS40060. 34 p. : ill. ; 28 cm. --. Bibliography: p. 34. (NAL Call No.: SB189.77.E5).

0921

**The feasibility of providing emergency storage for feed grains in New England** / P. Geoffrey Allen, John K. Hagerty, Bernard J. Morzuch. -. Allen, P. Geoffrey. Amherst Massachusetts Agricultural Experiment Station 1979. 45 p. --. Bibliography: p. 28. (NAL Call No.: 100 M38H (1) No.663).

0922

**An investigation of rice bran oil tank settling.**  
JJASDH. Belavadi, V.K. Bhowmick, D.N. Champaign, Ill. : The Society. Journal of the American Oil Chemists' Society. Feb 1988. v. 65 (2). p. 241-245. Includes references. (NAL Call No.: DNAL 307.8 J82).

# AGRICULTURAL ENGINEERING

0924

The answer is "yes!" (Spraying water on grain as it is handled to reduce dust in elevators). Mercer Island, Wash., D. Kinnan. Harvest times. Second Quarter 1980. v. 3 (2). p. 23. ill. (NAL Call No.: SB189.73.H3).

0925

Dangers in the air when handling livestock (Silo and manure pit gasses, grain dusts, pesticides, accident prevention). Aherin, R.A. MN. Eckberg, S.R.; Porte, A.R. St. Paul, Minn., The Service. Extension folder. Minnesota. University. Agricultural Extension Service. 1979. 1979. (500). 5 p. ill. (NAL Call No.: 275.29 M66EX).

0926

Deadlock over explosive dust (Grain elevator safety, grain dusts). Marshall, E. SCIEA. Washington : American Association for the Advancement of Science. Science. Nov 4, 1983. v. 222 (4623). p. 485-487. Includes references. (NAL Call No.: 470 SCI2).

0927

Dust explosion hazards in bakeries (and in grain elevators). Coons, J.D. Chicago, The Society. Proceedings ... annual meeting of the American Society of Bakery Engineers. American Society of Bakery Engineers. 1979. 1979. (55th). p. 206-211. ill. (NAL Call No.: 389.9 AM37P).

0928

Dust suppression characteristics of corn, wheat and soybeans treated with mineral oil additives. Jones, D.D. Parnell, C.B. Jr. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1985 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1985. (fiche no. 85-3558). 35 p. ill. Includes references. (NAL Call No.: DNAL FICHE S-72).

0929

Equipment, guidelines and software for interactive computer graphics agricultural engineering applications. Watson, D.G. Peterson, G.A.; Bickert, W.G. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1985 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1985. (fiche no. 85-4505). 15 p. ill. (NAL Call No.: DNAL FICHE S-72).

0930

Examining the use of additives to control grain dust in a commercial grain elevator. Lai, F.S. Martin, C.R.; Miller, B.S. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1984 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, Winter 1984. (84-3575). 22 p. (NAL Call No.: DNAL FICHE 290.9 AM32P).

0931

Facts about grain elevator explosions. United States. Dept. of Agriculture. New York, Gordon & Breach. Ecology of food and nutrition. 1980. v. 10 (2). p. 123-124. (NAL Call No.: TX341.E3).

0932

Grain dust abstracts / compiled by Fang S. Lai. -. Lai, Fang S. (Manhattan, Kan.?) U.S. Dept. of Agriculture, Science and Education Administration 1981. Issued April 1981 ~Includes index. 28 p. ; 22 cm. --. (NAL Call No.: AZ5076.A1U54 no.12).

0933

Grain dust research progress (Prevention of explosions in grain elevators). Martin, W. SEA-WO~AR-NC. Washington, D.C., The Administration. Agricultural research - U.S. Department of Agriculture, Science and Education Administration. United States. Dept. of Agriculture. Science and Education Administration. Mar 1980. v. 28 (9). p. 10-11. ill. (NAL Call No.: 1.98 AG84).

**(AGRICULTURAL ENGINEERING)**

**0934**

**Occupational Safety and Health Division grain elevator safety checklist.**  
Mercer Island, Wash., D. Kinnan. Harvest times. Second Quarter 1980. v. 3 (2). p. 18. (NAL Call No.: SB189.73.H3).

**0935**

**Prevention of dust explosions in grain elevators : an achievable goal : a task force report.** -.

United States ~ Dept. of Agriculture ~ Office of the Special Coordinator for Grain Elevator Safety and Security. (Washington) Dept. of Agriculture, Office of the Special Coordinator for Grain Elevator Safety and Security 1980. xii, 172 p. : ill., maps ; 26 cm. Bibliography: p. 171-172. (NAL Call No.: aTH4461.U52).

**0936**

**Research projects and activities for minimizing the potential of elevator explosions recommended by the National Grain & Feed Association / prepared by the Research Subcommittee of the National Grain and Feed Association.**

National Grain and Feed Association ~ Research Subcommittee. Washington, D.C. The Association 1978. 9, (4) leaves ; 28 cm. (NAL Call No.: TJ1415.N3).

**0937**

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Spray, R.A. Clemson, S.C., The Service. Circular - USDA Cooperative Extension Service, Clemson University. Mar 1982. Mar 1982. (629). 21 p. ill. (NAL Call No.: 100 S08 (2)).

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Nelson, G.S. College Station, Agricultural Experiment Station. Texas agricultural progress. Winter 1979. v. 25 (1). p. 5-7. ill. (NAL Call No.: 100 T31TE).

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**The grain elevator.**

Schoeff, R.W. Manhattan, Kan. : Sunflower University Press, 1987. The Rise of the wheat state : a history of Kansas agriculture, 1861-1986 / edited by George E. Ham and Robin Higham. p. 123-136. ill. (NAL Call No.: DNAL S451.K2R5 1987).

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0995

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Britton, M.G. Moysey, E.B. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1986 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1986. (fiche no. 86-4502). 10 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

0997

**Guidelines for the investigation of grain dust explosions report /of the Explosion Investigation Subpanel of the Panel on Causes and Prevention of Grain Elevator Explosions of the Committee on Evaluation of Industrial Hazards, National Materials Advisory Board, Commission on Engineering and Technical Systems, National Research Council. --.**  
Washington, D.C. : National Academy Press ; Springfield, Va. : For sale by NTIS, 1983. Study conducted under contract no. J-9-F-8-0137 with DSHA ; funding was provided by OSHA, National Institute for Occupational Safety and Health, and the Dept. of Agriculture. xiii, 32 p. ; 28 cm. --. Bibliography: p. 15. (NAL Call No.: DNAL TH4461.G8).

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**Housekeeping-facility maintenance.**  
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**Housekeeping/tools.**  
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Kocher, M.F. Bodman, G.R.; Lay, M. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1981. Paper presented at the 1981 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase

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from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1981. (fiche no. 81-4554). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

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**Solar heat for corn drying under Ohio conditions. II. Summer storage of solar heat.**  
Misra, R.N. Keener, H.M.; Roller, W.L. St. Joseph, Mich., The Society. Transactions of the ASAE - American Society of Agricultural Engineers. Mar/Apr, 1982. v. 25 (2). p. 459-464. Includes 20 ref. (NAL Call No.: 290.9 AM32T).

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**Solar heat reduces energy for in-bin grain drying systems (High moisture corn, Zea mays, transfer sequence).**  
Converse, H.H. Chang, C.S.; Sauer, D.B. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1982. Paper presented at the 1982 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1982. (fiche no. 82-3008). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

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**Stirring as an aid to in-bin solar drying of corn.**  
Baker, K.D. Abbouda, E.K.; Foster, G.H. St. Joseph, Mich., The Society. Transactions of the ASAE - American Society of Agricultural Engineers. Dec 1979. Dec 1979. (79-3522). 15 p. 7 ref. (NAL Call No.: 290.9 AM32T).

1135

**Storage and drying of corn cobs (Alternative energy for grain drying).**  
Smith, R.D. Liljedahl, J.B.; Peart, R.M. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1983. Paper presented at the 1983 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1983. (fiche no. 83-3007). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

# DRAINAGE AND IRRIGATION

1136

## Kernel breakage and density of normal and opaque-2 maize grain as influenced by irrigation and nitrogen.

CRPSAY. Kniep, K.R. Mason, S.C. Madison, Wis. : Crop Science Society of America. Grain quality is important to farmers, grain elevators, millers, and domestic and foreign buyers. Excessive broken kernels can reduce the grade of grain, lower the selling price farmers receive, decrease production from dry and wet milling processes, reduce artificial drying efficiency, and increase potential dust hazards. However, little attention has been focused on the influence of production practices on grain quality. This study was conducted to determine whether irrigation and soil N levels would affect the quality of maize (*Zea mays* L.) grain. Two water regimes and five N fertilization levels ranging from zero to 360 kg ha<sup>-1</sup> were applied to two normal and two opaque-2 hybrids. The experimental site was a Sharpsburg silty clay loam (fine, montmorillonitic, mesic, Typic Argiudoll) near Mead, NE. Opaque-2 grain was 2.4 times more susceptible to breakage, and 8% lower in density than normal grain. Irrigation increased kernel breakage susceptibility (KBS) from 13.5 to 17.9, 3.2 to 3.8, and 5.4 to 7.3% in 1985, 1986, and 1987, respectively. Increasing soil N levels decreased KBS for all hybrids. Kernel density (KD) of opaque-2 grain was increased with irrigation but decreased with higher N levels. In contrast, KD of normal grain decreased with irrigation but increased with higher N levels. Average grain yields were 9.4, 7.3, and 5.5 Mg ha<sup>-1</sup>, with irrigation increasing yields 28, 9, and 27% over nonirrigation in 1985, 1986, and 1987, respectively. Normal hybrids averaged 5% greater yields than opaque-2 hybrids. Yield increased quadratically with N rate within each moisture regime in each year. Results indicate production practices influence KBS and KD as well as yield, and may become important considerations in the future. Crop science. Jan/Feb 1989, v. 29 (1). p. 158-163. Includes references. (NAL Call No.: DNAL 64.8 C883).

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**Corn breakage in overseas shipments to Japan.**  
Paulsen, M.R. Hill, L.D.; Shove, G.C.; Kuhn, T.J. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1987 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices.~ Includes statistical data. 1987. (fiche no. 87-6044). 26 p. ill. Includes references. (NAL Call No.: DNAL FICHE S-72).

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**Production, consumption, and storage of Virginia corn and soybeans.**

Kenyon, D.E. Mundy, K.P. Blacksburg, Va. : The University. Extract: Virginia does not produce sufficient corn and soybeans to meet feed demand by livestock and poultry within the state. The objectives of this study were to 1) determine the magnitude of the deficit, 2) determine if storage was aggravating the problem, and 3) determine why Virginia does not produce enough corn and soybeans to meet feed demand. Bulletin - Virginia Agricultural Experiment Station, Virginia Polytechnic Institute and State University. Apr 1983. (83-2). 66 p. Includes 12 references. (NAL Call No.: DNAL S541.5.V8B8).

1139

**Reducing corn breakage susceptibility through rehydration.**

Salter, K.L. Pierce, R.O. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1987 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1987. (fiche no. 87-6045). 16 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

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**Uses of sorghum grainby Carleton R. Ball and Benton E. Rothgeb. --.**

Ball, Carleton, R. 1873-1958. Washington, D.C. : U.S. Dept. of Agriculture, 1915. 16 p. : ill. --. Bibliography: p. 16. (NAL Call No.: DNAL Fiche S-70 no.686).

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**ABC hydraulic sweep auger (Grain bin cleaner).**  
Wickstrom, L.L. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1982. Paper presented at the 1982 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1982. (fiche no. 82-3022). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

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**Aerating grain in storage.**  
Hammond, C. Athens, Ga. : The Service. Bulletin - Cooperative Extension Service, University of Georgia, College of Agriculture. May 1985. (712, rev.). 12 p. ill. (NAL Call No.: DNAL 275.29 G29B).

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**Aerobic deterioration of alfalfa and maize silage.**  
O'Kiely, P. Muck, R.E.; O'Connor, P.L. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1986 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1986. (fiche no. 86-1526). 36 p. ill. Includes references. (NAL Call No.: DNAL FICHE S-72).

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**Aflatoxin potential in high airflow low temperature grain drying.**  
Reid, J.F. Baker, J.L.; Vaughan, D.H. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1981. Paper presented at the 1981 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1981. (fiche no. 81-3518). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

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**Allowable storage time of corn as affected by heat buildup, natural convection and aeration.**  
Brooker, D.B. Duggal, A.K. St. Joseph, Mich., The Society. Transactions of the ASAE - American Society of Agricultural Engineers. May/June 1982. v. 25 (3). p. 806-810. 6 ref. (NAL Call No.: 290.9 AM32T).

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**An assessment of the Mississippi River Gulf Port intermodal transportation and storage complex (Grain).**  
Gauthier, W.M. Hadder, G.R.; Traylor, H.D. Jefferson City, Mo., The Association. Official proceedings of the annual meeting - American Association of Feed Microscopists. 1980. 1980. (28th). p. 11-16. 9 ref. (NAL Call No.: 389.79 AM34).

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**Batch-in-bin grain dry.**  
Bridges, T.C. White, G.M.; Loewer O.J. Jr. Lexington : The Service. A.E.N. - Dept. of Agricultural Engineering. University of Kentucky, Cooperative Extension Service. Oct 1984. (57). 5 p. ill. (NAL Call No.: DNAL S671.K4).

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**A biomass-fired grain drying system for Montana.**  
Erickson, L. Bozeman : The Station. Montana agresearch - Montana Agricultural Experiment Station, Montana University. Winter 1985. v. 2 (1). p. 15-18. ill. Includes references. (NAL Call No.: DNAL S451.M9M9).

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**Breakage susceptibility of blended corn.**  
Nguyen, V.T. Bern, C.J.; Wilcke, W.F.; Anderson, M.E. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1981. Paper presented at the 1981 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1981. (fiche no. 81-3527). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

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1150

**Breakage susceptibility of Corn-Belt genotypes (Maize hybrids and inbreds, stress cracks, moisture content, grain temperature, genotype, seasonal growing conditions, quality).**

Paulsen, M.R. Hill, L.D.; White, D.G.; Sprague, G.F. St. Joseph, Mich. : The Society. Transactions of the ASAE - American Society of Agricultural Engineers. Nov/Dec 1983. v. 26 (6). p. 1830-1836, 1841. ill. Includes references. (NAL Call No.: 290.9 AM32T).

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**Breakage susceptibility of rewetted and blended corn samples.**

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Carson, J.M. University Park, Pa. : The Service. Extension circular - Pennsylvania State University, Agricultural Extension Service. Nov 1988. (360). 8 p. ill. (NAL Call No.: DNAL S544.3.P4E8).

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**The challenge of harvesting and drying grain sorghum.**

Donald, J. Raleigh, Harvest. The Peanut farmer. June 1980. v. 16 (6). p. 14. (NAL Call No.: SB351.A1P3).

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**Coefficient of friction of wheat on smooth and corrugated metal surfaces.**

Moore, D.W. White, G.M.; Ross, I.J. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1983. Paper presented at the 1983 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1983. (fiche no. 83-4002). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

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**Collection, processing and combustion of corncobs to provide heat for drying corn (Biomass fuel).**

Morey, R.V. Schertz, C.E. (Washington, D.C. : The Department, 1983?). 3rd annual Solar and Biomass Workshop, April 26-28, 1983, Holiday Inn, Atlanta Airport/North Atlanta, Georgia / co-sponsors United States Department of Agriculture ... (et al.). p. 229-232. Includes references. (NAL Call No.: aTJ810.S6 1983).

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Pichai, S. Hunt, D.R. St. Joseph, Mich., The Society. Transactions of the ASAE - American Society of Agricultural Engineers. Jan/Feb 1982. v. 25 (1). p. 58-61. Includes 7 ref. (NAL Call No.: 290.9 AM32T).

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**Comparison of controlled-release ammonia solutions and aqueous ammonia for preserving high-moisture maize (Molds).**

Van Cauwenberge, J.E. Bothast, R.J.; Young, D.C. St. Paul, Minn., American Association of Cereal Chemists. Cereal chemistry. July/Aug 1981. v. 58 (4). p. 293-295. Bibliography p. 295. (NAL Call No.: 59.8 C33).

1158

**Comparison of drying rates and quality parameters for selected corn inbreds/hybrids (Feed processing).**

Stroshine, R. Emam, A.; Tuite, J.; Cantone, F.; Kirleis, A.; Bauman, L.; Okos, M. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1981. Paper presented at the 1981 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1981. (fiche no. 81-3529). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

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**A comprehensive model of forage changes in the silo.**

Buckmaster, D.R. Rotz, C.A.; Muck, R.E. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1988 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph,

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Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1988. (fiche no. 88-1069). 27 p. ill. Includes references. (NAL Call No.: DNAL FICHE S-72).

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### Computer control and modeling of an extruder: dynamics.

Mulvaney, S.J. Hsieh, F.; Onwulata, C.; Brent, J. Jr.; Huff, H.E. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1988 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1988. (fiche no. 88-6517). 18 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

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### Concrete wall design for flat grain storage buildings.

Runestad, J.A. Pedersen, J.H. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1983. Paper presented at the 1983 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1983. (fiche no. 83-4006). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

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### Concurrent drying (Grain).

Oentine, C. Mount Morris, Ill., Watt Publishing. Feed management. Mar 1981. v. 32 (3). p. 18, 22. ill. (NAL Call No.: 389.78 EA7).

1163

### Conservation and aerobic stability of forage and sweet sorghum silages treated with acrylic or caproic acid.

AGUOAT. Hill, N.S. Posler, G.L.; Bolsen, K.K.; Ware, G.D. Madison, Wis. : American Society of Agronomy. Agronomy journal. July/Aug 1987. v. 79 (4). p. 615-618. Includes references. (NAL Call No.: DNAL 4 AM34P).

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### Conveying equipment in grain and feed operations.

Stevens, C. Minneapolis, Miller. Feedstuffs. Feb 23, 1981. v. 53 (8). p. 29-35. ill. 5 ref. (NAL Call No.: 286.81 F322).

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Anderson, M.E. Bern, C.J.; Baker, J.L. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1983. Paper presented at the 1983 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1983. (fiche no. 83-3005). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

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### Countercurrent diffuser theory applied to sweet sorghum silage.

TAAEA. Noah, K.S. Linden, J.C. St. Joseph, Mich. : American Society of Agricultural Engineers. Transactions of the ASAE. July/Aug 1989. v. 32 (4). p. 1426-1430. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

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### CULBAC and ADD-F (formic acid) additives for sundangrass and high moisture shelled corn silages.

Bolsen, K. Hinds, M.; Ilg, H. Manhattan, Kan. : The Station. Report of progress - Kansas Agricultural Experiment Station, Kansas State College of Agriculture and Applied Science. Mar 1984. (448). p. 64-68. (NAL Call No.: DNAL 100 K133P).

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**Density-pressure relationship of whole-plant corn silage (Grain storage).**  
Negi, S.C. Jofriet, J.C.; Buchanan-Smith, J. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1983. Paper presented at the 1983 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1983. (fiche no. 83-4001). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

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**Directory of grain sorghum elevators.**  
Jones, L.L. Little Rock, Ark. : The Service. MP - University of Arkansas. Cooperative Extension Service. Aug 1984. (228). 12 p. (NAL Call No.: DNAL 275.29 AR4MI).

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**Drying and cooling flaked grain.**  
Naylor, J.L. Smith, R.M. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1981. Paper presented at the 1981 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1981. (fiche no. 81-3516). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

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**Drying and storage of agricultural crops / Carl W. Hall. -.**  
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**Drying rates of standing compared to windrowed wheat.**

AGJOAT. Clarke, J.M. Madison, Wis. : American Society of Agronomy. Agronomy journal. Sept/Oct 1984. v. 76 (5). p. 803-806. Includes references. (NAL Call No.: DNAL 4 AM34P).

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**Drying shelled corn in thin cribs.**

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Hanner, J.P. III. Murphy, J.P. Manhattan, Kan. : The Service. C - Kansas State University, Cooperative Extension Service. Aug 1987. (687). p. 21-23. (NAL Call No.: DNAL 275.29 K13EX).

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1178

**Dust control and Collection. I. (Grain storage, feed mills, explosion control).**  
Stevens, C. Minneapolis, Miller. Feedstuffs. Mar 23, 1981. v. 53 (12). p. E1-E5. ill. 9 ref. (NAL Call No.: 286.81 F322).

Includes references. (NAL Call No.: DNAL 47.8 AM33P).

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**Dust control and collection. II. (Grain processing equipment).**  
Stevens, C. Minneapolis, Miller. Feedstuffs. Apr 27, 1981. v. 53 (17). p. E1-E6, E27-E28. 6 ref. (NAL Call No.: 286.81 F322).

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**Dust control for truck and rail receiving (Grain facilities).**  
Winsett, W.G. Washington, D.C. : National Grain & Feed Association, c1981. Dust control for grain elevators : comprehensive illustrated papers presented at the Grain Dust Control Seminar, May 7-8, 1981, St. Louis, Missouri / (ed. R.C. Gordon). p. 31-63. ill. (NAL Call No.: TH7697.G67G7 1981).

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**Effectiveness of Cold-Flo anhydrous ammonia with forage sorghum silage.**  
Kuhl, G. Carlson, C.; Williamson, G.; Jorgensen, B. Brookings, S.D., The Station. Annual cattle feeders day. - South Dakota, Agricultural Experiment Station. 1981. 1981. (24th). p. 28-30. (NAL Call No.: 43.9 S0882).

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Lopez, N.E. Baker, J.P.; Jackson, S.G. Lake Elsinore, Calif. : William E. Jones, DVM. Journal of equine veterinary science. Sept/Oct 1988. v. 8 (5). p. 375-378. Includes references. (NAL Call No.: DNAL SF951.J65).

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**Energy expenditures for drying and harvesting losses as influenced by harvesting capacity and weather (Corn, Zea mays).**  
Loewer, O.J. Bridges, T.C.; White, G.M.; Razor, R.B. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1982. Paper presented at the 1982 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1982. (fiche no. 82-3515). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

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**Effect of heat drying of corn on the extraction of citrinin.**  
POSICAL. Nelson, T.S. Beasley, J.N.; Kirby, L.K.; Johnson, Z.B.; Ciegler, A. Champaign, Ill. : Poultry Science Association. Poultry science. May 1985. v. 64 (5). p. 866-870.

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**An engine-driven heat pump for grain conditioning (Barley, grain drying).**  
Cunney, M.B. Williams, P.A.; Marley, S.J. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1983. Paper presented at the 1983 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St.

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**Evaluating drying rate and grain quality parameters of corn inbreds/hybrids: methodology (Feed processing).**

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**An evaluation of chemical methods to extend the allowable storage time of wet distillers' grains.**

JAFCAU. Nofsinger, G.W. VanCauwenberge, J.E.; Bothast, R.J.; Kwolek, W.F. Washington, D.C. : American Chemical Society. Journal of agricultural and food chemistry. Mar/Apr 1983. v. 31 (2) AGL. p. 276-279. Includes references. (NAL Call No.: DNAL 381 J8223).

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**Evidence for the inhibition of fungi in corn meal by organic acids being dependent on the character of the corn meal.**

Tabib, Z. Dixon, R.C.; Hagler, W.M.; Hamilton, P.B. Champaign, Ill. : Poultry Science Association. Poultry science. Aug 1984. v. 63 (8). p. 1516-1523. ill. Includes references. (NAL Call No.: 47.8 AM33P).

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JFPRDR. Karunaratne, A. Wezenberg, E.; Bullerman, L.B. Ames, Iowa : International Association of Milk, Food, and Environmental Sanitarians. The effect of three individual species of lactobacilli (*Lactobacillus acidophilus*, *L. bulgaricus*, and *L. plantarum*) and a commercial silage inoculant, containing three different strains of the same species, on growth and aflatoxin production of *A. flavus* subsp. *parasiticus* NRRL 2999 was determined. The study was done in three substrates; a liquid semi-synthetic broth, rice, and corn. The effect of the growing cell masses of the lactobacilli as well as the effect of metabolic products contained in cell free filtrates were determined in the liquid medium. The cells were effective in preventing growth of the mold, and bacterial metabolites were effective in reducing the amount of aflatoxin produced, although growth was not affected. The prevention of growth that was observed was determined to be relative to a pH effect and microbial competition; however, the lower levels of aflatoxin obtained in the presence of cell free supernatant culture fluids could not be explained on the basis of pH or competition. Mold growth was not affected by the presence of the silage inoculant on the rice and corn. However, increased levels of aflatoxin B1 were observed in the presence of the silage inoculant on rice, and decreased levels of aflatoxin G1 were observed on the presence of the silage inoculant on corn. Journal of food protection. Mar 1990. v. 53 (3). p. 230-236. Includes references. (NAL Call No.: DNAL 44.8 J824).

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# MATHEMATICS AND STATISTICS

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## An aeration duct design model for flat grain storage.

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## Characteristics of grain elevators that contract with railroads.

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## Deep-bed rice drying simulation using two generalized single-layer models.

TAAEA. Noomhorm, A. Verma, L.R. St. Joseph, Mich. : The Society. Transactions of the ASAE - American Society of Agricultural Engineers. Sept/Oct 1986. v. 29 (5). p. 1456-1461. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

(MATHEMATICS AND STATISTICS)

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**Design and analysis of competition experiments in stored-product entomology.**

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**Determination of the optimum drying performance for continuous in-bin shelled corn drying systems.**

Bridges, T.C. Loewer, O.J.; White, G.M.; Ross, I.J. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1984 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, Winter 1984. (84-3521). 14 p. (NAL Call No.: DNAL FICHE 290.9 AM32P).

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**Dynamic programming and the economics of optimal grain storage.**

Plato, G. Gordon, D. Washington, D.C. : The Service. Extract: Understanding the dynamic programming algorithms used in the optimal grain storage literature is a prerequisite to understanding the findings of this literature. This article introduces these dynamic programming algorithms by examining several in terms of their underlying economic behavior. These are Gustafson's original algorithms and algorithms developed by Gardner and Ippolito that include rational producer response in addition to optimal grain storage, making them the most advanced in the optimal grain storage literature. Agricultural economics research - United States Dept. of Agriculture, Economic Research Service. Jan 1983. v. 35 (1). p. 10-22. Includes 7 references. (NAL Call No.: EC7AGR).

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**Dynamic wall loads in an eccentrically unloaded model grain bin.**

Thompson, S.A. Usry, J.L.; Morse, B.D. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1984 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, Winter 1984. (84-4513). 17 p. (NAL Call No.: DNAL FICHE 290.9 AM32P).

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**Economic analysis of domestic and ocean transportation for U.S. grain shipments.**

Koo, W.W. Fargo, N.D. : Dept. of Agricultural Economics, North Dakota Agricultural Experiment Station. Extract: This study evaluates the interdependency between domestic and ocean transportation systems with changes in ocean freight rates and identifies impacts of the existing port capacity on the domestic and ocean shipments of grain. The method used for this study is a mathematical programming model based on a linear programming algorithm. The model has 88 producing regions, 24 domestic consuming regions, 13 export ports, 9 commercial storage locations, and 11 foreign import regions. Three time periods and three different crops are also defined in the model. Agricultural economics report. Oct 1982. Oct 1982. (164). 50 p. Includes 25 references. (NAL Call No.: 281.9 N814A).

## (MATHEMATICS AND STATISTICS)

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### An economic analysis of on-farm rice drying and storage facilities.

AKABA. Wailes, E.J. Holder, S.H.; Welch, W.P. Fayetteville : The Station. Bulletin - Arkansas, Agricultural Experiment Station. Includes statistical data. Nov 1984. (875). 30 p. Includes 12 references. (NAL Call No.: DNAL 100 AR42).

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### An economic analysis of U.S. grain marketing and transportation system.

Koo, W.W. Thompson, S. Fargo : The Station. Extract: The purpose of this study is to optimize the U.S. grain distribution system under the institutional constraints imposed by both the agriculture and transportation sectors. The method used in this study is a spatial equilibrium model based on a mathematical programming algorithm. The model incorporates transportation and storage activities in marketing grain from producing regions to market destinations in the United States. North Dakota research report - North Dakota Agricultural Experiment Station. June 1982. June 1982. (89). 43 p. Includes 29 references. (NAL Call No.: 100 N813R).

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### Effects of heterogeneity and compressibility on air flow distribution.

Chen, S. Hsueh, W. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1987 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1987. (fiche no. 87-6547). 18 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

1385

### Effects of noncatastrophic control technologies that alter life history parameters on insect population growth: a simulation study.

EVETEX. Throne, J.E. Lanham, Md. : Entomological Society of America. I investigated the effects of noncatastrophic control technologies that alter life history parameters (such as the use of resistant plant varieties) on the growth of insect populations. I used a computer model to simulate population dynamics of the flat grain beetle, *Cryptolestes pusillus* (Schonherr). The effects of increasing duration of larval development (by 5, 10, 15, or 20 d) or decreasing fecundity or larval survival (by 25, 50, or 75%) on population growth were simulated. Growth curves for populations with reductions in fecundity or larval survival were nearly identical. The

effects of decreasing fecundity or larval survival were apparent during the first generation, whereas the effects of increasing duration of larval development did not become apparent until the second generation. Altering any of the life history parameters resulted in as much as 99% reduction in population levels at constant temperatures and as much as 87% reduction in population levels at actual temperatures in a grain bin. The results indicate that use of control technologies that cause even a small change in a life history parameter may have a significant effect on population growth when applied over a growing or storage season. The combination of such technologies with other methods of control may improve the cost effectiveness of pest management techniques, even if the noncatastrophic control techniques do not provide adequate control when used alone. Environmental entomology. Dec 1989. v. 18 (6). p. 1050-1055. Includes references. (NAL Call No.: DNAL QL461.E532).

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### Elastoplastic constitutive parameters of wheat for a cyclic load model.

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1985. (fiche no. 85-4505). 15 p. ill. (NAL Call No.: DNAL FICHE S-72).

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**An expert system for determining bottlenecks in on-farm grain processing systems.**

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**Finite element analysis of grain bins subjected to eccentric flow pressure.**

Jerath, S. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1988 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1988. (fiche no. 88-4027). 10 p. ill. Includes references. (NAL Call No.: DNAL FICHE S-72).

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Zhang, Q. Puri, V.M.; Manbeck, H.B. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1988 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1988. (fiche no. 88-4522). 27 p. ill. Includes references. (NAL Call No.: DNAL FICHE S-72).

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**A flexible rail rate policy: impacts on U.S. feed grains.**

XATBA. Hoffman, L. Hill, L.; Leath, M.N. Washington, D.C. : The Department. Extract: U.S. feed grains could be transported more efficiently by railroads through implementation of a combined peak and off-peak rail rate structure. This study assumes this policy had been in effect during a representative crop year and determines that a 5- to 15-percent change in rail rates would increase rail revenues and volume, reduce seasonal variation of rail demand, and create incentives for producers to store feed grain at county locations and ship at a later date. However, increased costs for storage, transportation, and handling would weaken the overall financial stability of the feed grain market. Technical bulletin - United States Dept. of Agriculture. Available from NTIS, order no. PB85-195576/AS.~ Includes statistical data. Apr 1985. (1701). 34 p. Includes 50 references. (NAL Call No.: DNAL 1 AG84TE).

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**Grain drying with a solar energy intensifier-simulation and validation (Model).**

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**The impact of rice fissuring on mill yields.**  
Velupillai, L. Pandey, J.P. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1988 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1988. (fiche no. 88-6082). 23 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

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**Infestation by *Cryptolestes ferrugineus* (Coleoptera: Cucujidae) of newly harvested wheat stored on three Kansas farms.**  
JEENAI. Hagstrum, D.W. Lanham, Md. : Entomological Society of America. The vertical distributions of *Cryptolestes ferrugineus* (Stephens) in newly harvested wheat, *Triticum aestivum* L., on three Kansas farms during the first two months of storage were studied to characterize the process of infestation. In three bins, the number of adult *C. ferrugineus* tended to decrease from top to bottom layers of grain. In the fourth bin, the numbers decreased from top and bottom layers to middle layers. A regression model explained 82.2% of the variation between bins. These data suggest that most of the insect infestation occurred after the wheat was loaded into the bin instead of before or during loading and that insects then dispersed from the grain surfaces into the grain mass. Journal of economic entomology. Apr 1989. v. 82 (2). p. 655-659. ill. Includes references. (NAL Call No.: DNAL 421 J822).

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**Loads in a scaled, model bin subjected to cyclic ambient temperature.**  
TAAEA. Li, Y. Puri, V.M.; Manbeck, H.B. St. Joseph, Mich. : American Society of Agricultural Engineers. Transactions of the ASAE. Mar/Apr 1990. v. 33 (2). p. 651-656. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

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**Measurement of thermally induced pressures in a model grain bin.**  
TAAEA. Manbeck, H.B. Muzzelo, L.M. St. Joseph, Mich. : The Society. Transactions of the ASAE - American Society of Agricultural Engineers. July/Aug 1985. v. 28 (4). p. 1253-1258, 1264. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

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**A microprocessor-based grain drying control system (Corn, *Zea mays*).**  
Simonton, H.R. Allison, J.M.; McLendon, B.D. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1981. Paper presented at the 1981 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1981. (fiche no. 81-5027). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

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**A microprocessor controlled crossflow grain dryer test unit (Monitors dry bulb and dew point temperatures, hardware, software).**  
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**Minimum explosive concentration as affected by particle size and composition (Relevant to grain dust) (2 fiche).**  
Garrett, D.W. Lai, F.S.; Fan, L.T. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). 1982. Paper presented at the 1982 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1982. (fiche no. 82-3580). 1 microfiche : ill. Includes references. (NAL Call No.: FICHE S-72).

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**A model for ear corn drying.**  
Sharaf-Eldeen, Y.I. Blaisdell, J.L.; Hamdy, M.Y. St. Joseph, Mich., The Society. Transactions of the ASAE - American Society of Agricultural Engineers. Sept/Oct 1980. v. 23 (5). p. 1261-1265, 1271. ill. 32 ref. (NAL Call No.: 290.9 AM32T).

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**Modeling and control of a twin screw extruder.**  
Richburg, L.L. Whittaker, A.D. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1988 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1988. (fiche no. 88-6515). 16 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

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**Optimization of the in-bin counterflow drying of corn.**  
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**Packing factors of whole grains during unloading.**  
Thompson, S.A. McNeill, S.G.; Ross, I.J.; Bridges, T.C. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1988 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1988. (fiche no. 88-4020). 24 p. ill. Includes references. (NAL Call No.: DNAL FICHE

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**Packing factors of whole grains in storage structures.**

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**Pest of stored peanuts: toxicity and persistence of chlorpyrifos-methyl.**

JEENAI. Arthur, F. Lanham, Md. : Entomological Society of America. Virginia type peanuts were treated with 5, 10, 20, and 30 ppm chlorpyrifos-methyl and infested with fifth-instar almond moth, Cadra cautella (Walker), and Indianmeal moth, Plodia interpunctella (Hubner) at T1, T60, T120, and T180 (days after application). Rates of 5 and 10 ppm did not kill almond moth larvae at T1, and rates of 20 and 30 ppm were only marginally effective. Indianmeal moth larvae were more susceptible to chlorpyrifosmethyl than were almond moth larvae, but only the 20 and 30 ppm rates gave control at T1. Adult red flour beetles, Tribolium castaneum (Herbst), and merchant grain beetles, Oryzaephilus mercator (Fauvel), were also tested at T1, T60, T120, T180, and T270. Rates of 20 and 30 ppm were effective against both beetle species for at least 180 d after application. Journal of economic entomology. Apr 1989. v. 82 (2). p. 660-664. Includes references. (NAL Call No.: DNAL 421 J822).

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**Production, utilization, and marketing patterns for Illinois grains and soybeans.**

Hill, L.D. Brophy, J.P.; Leath, M.N. Urbana, Ill. : The Department. AERR - University of Illinois, Department of Agricultural Economics. Includes statistical data. June 1984. (196). 53 p. Includes 5 references. (NAL Call No.: DNAL 281.9 IL62).

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**Public stocks of grain and the market for grain storage (Supply and demand, price stabilization, econometric models).**

Gardner, B. New York : North-Holland, c1982. New directions in econometric modeling and forecasting in U.S. agriculture / editor, G.C. Rausser. p. 443-469. Includes references. (NAL Call No.: HD1755.N48).

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**The relationship of farmers' intentions to purchase and their actual purchases of metal bin grain storage.**

Dixon, B.L. Hill, L.D.; Saffell, M.S. Urbana, Ill., Illinois University. Dept. of Agricultural Economics. Extract: The first section of this article provides background information on grain storage practices, prior studies relevant to our topic, and the sample survey. From this information a limited dependent variable (Tobit) model of farmer behavior is hypothesized. In the second section, the estimates of the hypothesized model for explaining farmer behavior between March 1972 and April 1977 are analyzed. On the basis of this analysis, a simplified model is then estimated and used in the third section to forecast metal bin grain storage purchases for the period April 1977 to April 1982. North Central journal of agricultural economics. Jan 1980. v. 2 (1). p. 61-68. 9 ref. (NAL Call No.: HD1773.A3N6).

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**Sampling statistics and detection or estimation of diverse populations of stored-product insects.**

EVETEX. Hagstrum, D.W. Meagher, R.L.; Smith, L.B. College Park, Md. : Entomological Society of America. Sampling data for a variety of stages and species of insects, sampling devices, locations in the marketing systems, and types of grain fit a single model with narrow confidence limits, indicating that the same sampling statistics might be used with diverse populations of stored-product insects. The progressively faster increase in variance and the progressively slower increase in the fraction of samples with insects as insect population density increased can both be explained by a purely probabilistic increase in the chance of a sample having more than one insect. Environmental entomology. Apr 1988. v. 17 (2). p. 377-380. Includes references. (NAL Call No.: DNAL QL461.E532).

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**Selection of rewetting model for shelled corn.**

Krueger, C.A. Bunn, J.M. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1985 Winter Meeting of the American Society of Agricultural Engineers.

Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1985. (fiche no. 85-3511). 21 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

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**Simulation model for aeration of rice in warehouses.**

Lu, F. Rumsey, T.; Chen, P. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1987 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1987. (fiche no. 87-6548). 26 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

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**Simulation of corn desiccant preparation using solar energy (Computer simulation models, grain drying).**

Anderson, M.E. Bern, C.J.; Wilcke, W.F. St. Joseph, Mich. : The Society. Transactions of the ASAE - American Society of Agricultural Engineers. Jan/Feb 1984. v. 27 (1). p. 186-189, 194. Includes references. (NAL Call No.: 290.9 AM32T).

1417

**Simulations comparing insect species differences in response to wheat storage conditions and management practices.**

JEENAI. Hagstrum, D.W. Flinn, P.W. Lanham, Md. : Entomological Society of America. Seasonal changes in the populations of *Cryptolestes ferrugineus* (Stephens), *Oryzaephilus surinamensis* (L.), *Rhyzopertha dominica* (F.), *Sitophilus oryzae* (L.), and *Tribolium castaneum* (Herbst) and differences in their response to pest management programs were compared using validated population-growth-simulation models. The population growth of the five pest species differed in response to temperature and grain moisture conditions during storage, and this partially explains differences among species in their response to management practices. Aerating earlier in the storage season was generally more effective in limiting population growth of *C. ferrugineus* and *O. surinamensis* than the other species. Although fumigation was equally effective against all species, *S. oryzae* was able to grow more rapidly than the others as temperatures decreased in the fall. The internal feeders, *R. dominica* and *S. oryzae*, were much less affected by malathion protectant than the other three external-feeding species. As indicated by these three examples, it would sometimes be

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advantageous to know which species are present in choosing a management program. *Journal of economic entomology*. Dec 1990. v. 83 (6). p. 2469-2475. Includes references. (NAL Call No.: DNAL 421 J822).

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**Static and thermal loads in full size grain bins predicted by vectorized fem on supercomputer.**

Zhang, Q. Puri, V.M.; Manbeck, H.B. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1988 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1988. (fiche no. 88-4025). 24 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

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**Stored grain advisor: A knowledge-based system for management of insect pests of stored grain.**  
Flinn, P.W. Hagstrum, D.W. Moscow, Idaho : AI Applications. AI applications in natural resource management. 1990. v. 4 (3). p. 44-52. illl. Includes references. (NAL Call No.: DNAL QA76.76.E95A5).

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**Three-dimensional, finite element, heat transfer model of temperature distribution in grain storage bins.**

TAAEA. Alagusundaram, K. Jayas, D.S.; White, N.D.G.; Muir, W.E. St. Joseph, Mich. : American Society of Agricultural Engineers. *Transactions of the ASAE*. Mar/Apr 1990. v. 33 (2). p. 577-584. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

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**Trajectories of grain particles from through-type grain spreader.**

Chang, C.S. Converse, H.H.; Steele, J.L. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1988 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1988. (fiche no. 88-6577). 17 p. illl. Includes references. (NAL Call No.: DNAL FICHE S-72).

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**U.S. wheat-marketing system: an insect ecosystem.**

Hagstrum, D.W. Heid, W.G. Jr. College Park, Md. : The Society. *Bulletin of the Entomological Society of America*. Spring 1988. v. 34 (1). p. 33-36. Includes references. (NAL Call No.: DNAL 423.9 EN8).

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**Upgrading grain elevators to facilitate multicar rail shipments.**

Fuller, S. Litzenberg, K.; Makus, L.; Viscencio, H. New York : John Wiley. *Agribusiness, an international journal*. Summer 1986. v. 2 (2). p. 247-263. Includes 6 references. (NAL Call No.: DNAL HD1401.A56).

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**Ventilation concepts for insect control in grain storage and agricultural warehousing.**

Beard, J.T. Arthur, J.H. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1985 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1985. (fiche no. 85-3517). 20 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

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**Vertical loads on cables in a model grain bin.**

TAAEA. Thompson, S.A. St. Joseph, Mich. : The Society. *Transactions of the ASAE - American Society of Agricultural Engineers*. Mar/Apr 1987. v. 30 (2). p. 485-491. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

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**Viscoelastic properties of yellow-dent corn kernels.**

Waananen, K.M. Okos, M.R. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1987 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1987. (fiche no. 87-6560). 39 p. illl. Includes references. (NAL Call No.: DNAL FICHE S-72).

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**Wall loads as a function of discharge rate in a corrugated model grain bin.**

Thompson, S.A. Usry, J.L.; Legg, J.A. St. Joseph, Mich. : The Society. Paper - American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1985 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, Summer 1985. (fiche no. 85-4003). 26 p. Includes references. (NAL Call No.: DNAL FICHE 290.9 AM32P).

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**A weather risk model for grain drying system design and management in a developing region.**

TAAEA. Ziauddin, A.M. Liang, T. St. Joseph, Mich. : The Society. Transactions of the ASAE - American Society of Agricultural Engineers. Sept/Oct 1986. v. 29 (5). p. 1434-1440. ill. Includes references. (NAL Call No.: DNAL 290.9 AM32T).

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**Aeration system design with microcomputers.**  
Watson, D.G. Brook, R.C. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1988 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1988. (fiche no. 88-6057). 19 p. ill. Includes references. (NAL Call No.: DNAL FICHE S-72).

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**Agribusiness simulators for management training.**  
Babb, E.M. Experiment, Ga. : The Association. Extract: This paper describes four agribusiness simulators which can be processed on a microcomputer for use in undergraduate and extension teaching. The simulators model the environment in which supermarket chains, farm supply centers, and cooperative and proprietary grain elevators compete for business. Instruction manuals, user's manuals, and a diskette are distributed for each simulator. Each diskette contains programs to enter and print reports, and to create graphs of team performance. The simulators can be used to teach financial management concepts and techniques, as well as economic principles. Southern journal of agricultural economics - Southern Agricultural Economics Association. Dec 1985. v. 17 (2). p. 193-197. Includes 7 references. (NAL Call No.: DNAL AGE HD101.S6).

1431

**A bibliography of the Rusty Grain Beetle, *Cryptolestes ferrugineus* (Stephens) (Coleoptera: Cucujidae) / compiled by James E. Throne**  
Throne, James E. Washington, D.C.? : U.S. Dept. of Agriculture, Agricultural Research Service ; Springfield, Va. : Available from National Technical Information Service, 1987. Cover title.~ "August 1987."~ Includes indexes. 19 p. ; 28 cm. (NAL Call No.: DNAL aS21.R44A7 no.67).

1432

**Bioenergetics of the larger grain borer, *Prostephanus truncatus* (Horn) (Coleoptera: Bostrichidae), feeding on corn.**  
AESAAI. Demianyk, C.J. Sinha, R.N. College Park, Md. : The Society. Annals of the Entomological Society of America. May 1988. v. 81 (3). p. 449-459. Includes references. (NAL Call No.: DNAL 420 EN82).

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**Caring for stored grain in Kansas.**  
Manhattan, Kan. : The Service. L - Cooperative Extension Service, Kansas State University. Sept 1984. (710). 6 p. ill. (NAL Call No.: DNAL 275.29 K13LE).

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**Computer control and modeling of an extruder: dynamics.**

Mulvaney, S.J. Hsieh, F.; Onwulata, C.; Brent, J. Jr.; Huff, H.E. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1988 Winter Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1988. (fiche no. 88-6517). 18 p. Includes references. (NAL Call No.: DNAL FICHE S-72).

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**Crop storage decision programwritten by Paul Ellinger ; revised and converted to the IBM PC by Carlene Roberts. N/A.**  
Ellinger, Paul N. Roberts, Carlene. Urbana, Ill. : Illinois Cooperative Extension Service, College of Agriculture, University of Illinois at Urbana-Champaign : Distributed by Office of Computer Coordination, Illinois Cooperative Extension Service, c1984. Title from title screen.~ ILLINET no. AECC-B-103.~ Starting instructions are for IBM PC, XT and AT, dated 10/86.~ Entry word is on label. 1 computer disk ; 5 1/4 in. + 1 user's guide + 3 starting instructions. (NAL Call No.: DNAL QA76.8.I2594E4).

1436

**Evaluating quality factors of corn and soybeans using a computer vision system.**  
Gunasekaran, S. Cooper, T.M.; Berlage, A.G. St. Joseph, Mich. : The Society. American Society of Agricultural Engineers (Microfiche collection). Paper presented at the 1988 Summer Meeting of the American Society of Agricultural Engineers. Available for purchase from: The American Society of Agricultural Engineers, Order Dept., 2950 Niles Road, St. Joseph, Michigan 49085. Telephone the Order Dept. at (616) 429-0300 for information and prices. 1988. (fiche no. 88-3054). 29 p. ill. Includes references. (NAL Call No.: DNAL FICHE S-72).

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**Expert systems: redesigning structures to hold surplus grain.**

AGENA. Greenwood, K. St. Joseph, Mich. : American Society of Agricultural Engineers. Agricultural engineering. Nov/Dec 1988. v. 69 (7). p. 16-18. ill. (NAL Call No.: DNAL 58.8 AG83).

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**Zea Mays (Corn)**

3, 24, 40, 41, 48, 49, 56, 57, 63, 64, 67, 69, 70, 71, 81, 84, 88, 90, 97, 110, 123, 124, 126, 145, 148, 153, 154, 162, 164, 173, 174, 175, 176, 177, 178, 180, 184, 185, 187, 193, 194, 197, 199, 200, 201, 202, 204, 206, 211, 214, 215, 220, 221, 228, 230, 231, 232, 233, 234, 236, 240, 245, 247, 248, 249, 260, 263, 264, 265, 266, 267, 269, 270, 271, 272, 277, 278, 282, 284, 289, 290, 292, 293, 298, 299, 301, 302, 305, 306, 307, 308, 309, 310, 313, 314, 320, 321, 323, 324, 325, 329, 335, 336, 337, 340, 345, 358, 359, 360, 363, 365, 366, 369, 370, 371, 373, 375, 380, 382, 391, 396, 398, 399, 401, 404, 413, 414, 415, 417, 420, 421, 425, 428, 430, 432, 435, 437, 442, 444, 466, 468, 469, 471, 475, 495, 513, 515, 517, 518, 527, 533, 535, 547, 552, 555, 558, 562, 575, 577, 580, 587, 608, 620, 634, 635, 641, 643, 648, 651, 660, 661, 662, 668, 671, 674, 684, 699, 701, 708, 712, 725, 726, 750, 753, 756, 758, 759, 788, 793, 810, 818, 822, 835, 840, 845, 848, 849, 869, 885, 894, 895, 896, 900, 915, 920, 928, 957, 964, 965, 985, 1051, 1057, 1059, 1074, 1099, 1103, 1104, 1105, 1109, 1110, 1111, 1112, 1113, 1127, 1132, 1133, 1134, 1135, 1137, 1138, 1139, 1143, 1145, 1149, 1150, 1151, 1152, 1157, 1158, 1160, 1164, 1168, 1169, 1170, 1176, 1184, 1186, 1187, 1189, 1191, 1199, 1203, 1209, 1211, 1213, 1215, 1220, 1221, 1226, 1227, 1229, 1230, 1233, 1234, 1236, 1237, 1240, 1241, 1242, 1243, 1245, 1247, 1257, 1260, 1263, 1267, 1268, 1277, 1278, 1279, 1281, 1284, 1287, 1293, 1295, 1298, 1304, 1307, 1310, 1312, 1314, 1315, 1316, 1317, 1318, 1320, 1321, 1322, 1323, 1325, 1328, 1333, 1334, 1336, 1337, 1338, 1340, 1342, 1343, 1347, 1352, 1358, 1371, 1377, 1378, 1400, 1403, 1404, 1405, 1406, 1414, 1416, 1421, 1426, 1434, 1436

**Glycine Max (Soybeans)**

41, 45, 49, 57, 63, 70, 71, 84, 87, 90, 97, 110, 111, 124, 128, 135, 204, 231, 284, 301, 302, 325, 363, 391, 433, 444, 740, 928, 1138, 1410, 1436

**Hordeum (Barley)**

179, 186, 204, 231, 285, 291, 382, 387, 392, 448, 512, 646, 663, 672, 681, 739, 796, 797, 879, 892, 902, 1062, 1188, 1190, 1255, 1283

**Avena (Oats)**

186, 222, 225, 267, 335, 529, 537, 538, 561, 576, 641, 652, 701, 759, 849, 893, 902, 1283

**Millets**

216, 727

**Triticum (Wheat)**

34, 41, 44, 49, 57, 61, 70, 75, 86, 90, 97, 110, 111, 119, 127, 134, 164, 186, 210, 219, 236, 249, 260, 265, 267, 291, 294, 304, 316, 317, 322, 334, 335, 336, 382, 403, 412, 417, 418, 422, 430, 445, 446, 449, 450, 452, 456, 460, 470, 472, 475, 478, 479, 486, 487, 490, 493, 494, 496, 497, 499, 500, 502, 506, 509, 513, 516, 521, 522, 524, 525, 530, 531, 534, 536, 539, 541, 542, 544, 545, 546, 548, 551, 554, 566, 569, 570, 579, 583, 587, 605, 610, 613, 617, 619, 629, 631, 633, 634,

**Triticum (Wheat) continued:**

635, 639, 640, 641, 651, 655, 656, 658, 661, 667, 676, 688, 692, 696, 697, 701, 713, 719, 721, 740, 741, 745, 746, 751, 755, 757, 759, 762, 775, 778, 781, 784, 789, 798, 800, 803, 812, 816, 818, 819, 820, 827, 835, 836, 845, 849, 902, 918, 928, 956, 962, 988, 1062, 1094, 1102, 1106, 1154, 1175, 1225, 1251, 1283, 1357, 1376, 1386, 1410, 1417, 1421

**Oryza (Rice)**

19, 42, 43, 45, 46, 51, 59, 66, 73, 116, 195, 203, 207, 212, 218, 223, 227, 244, 312, 315, 332, 333, 341, 361, 405, 408, 461, 474, 491, 498, 525, 578, 584, 604, 611, 637, 638, 711, 717, 730, 751, 805, 810, 815, 912, 921, 1031, 1095, 1101, 1121, 1221, 1253, 1299, 1322, 1327, 1341, 1353, 1358, 1374, 1382, 1396, 1415

**Sorghums**

39, 70, 110, 118, 133, 150, 161, 170, 171, 172, 181, 191, 196, 198, 209, 217, 276, 281, 286, 338, 353, 357, 397, 430, 475, 488, 492, 511, 515, 540, 579, 614, 673, 715, 729, 740, 810, 896, 898, 900, 903, 1067, 1114, 1115, 1116, 1117, 1140, 1153, 1163, 1167, 1171, 1185, 1194, 1195, 1200, 1209, 1224, 1257, 1261, 1262, 1264, 1265, 1266, 1269, 1279, 1289, 1296, 1305, 1306, 1309, 1313, 1319, 1339, 1343, 1345, 1346, 1421

**Conoke (Rapeseed)**

973, 1062

**Diseases**

125, 129, 141, 149, 169, 183, 189, 190, 199, 206, 214, 235, 238, 258, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 289, 290, 295, 297, 313, 319, 321, 322, 336, 337, 338, 339, 340, 352, 360, 365, 366, 369, 370, 375, 380, 381, 383, 384, 388, 397, 409, 420, 421, 432, 434, 437, 446, 505, 510, 648, 665, 673, 677, 736, 801, 843, 844, 850, 852, 854, 915, 1144, 1157, 1184, 1200, 1284, 1315, 1316, 1317, 1318, 1319, 1320, 1321, 1322, 1323, 1324, 1325, 1326, 1327, 1328, 1329, 1330, 1331, 1332, 1360, 1364, 1366, 1368, 1438, 1440, 1447, 1449, 1450, 1451

**Insects**

7, 15, 18, 47, 119, 132, 164, 169, 183, 195, 200, 201, 202, 203, 205, 207, 209, 210, 211, 212, 213, 215, 216, 217, 218, 219, 228, 230, 236, 238, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 260, 294, 296, 329, 336, 367, 368, 369, 376, 377, 393, 436, 446-809, 859-878, 881-891, 904-910, 912, 913, 914, 917, 918, 1214, 1351, 1375, 1385, 1397, 1413, 1419, 1422, 1423, 1431, 1432, 1439

**Nematodes**

212, 259, 275

**Rodents**

141, 152, 238, 239, 252, 367, 372, 378, 389, 390, 392, 393, 406, 407, 423, 438, 446, 447, 878

**Safety**

8, 26, 55, 62, 135, 136, 327, 411, 440, 618, 735, 804, 817, 834, 934, 935, 936, 937, 938, 939, 940, 945, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1065, 1077, 1090, 1252, 1275, 1355–1366, 1440, 1445, 1449, 1452, 1453, 1455, 1456, 1461

**Cribs and Bins**

3, 24, 56, 65, 144, 145, 154, 163, 182, 331, 334, 343, 344, 350, 364, 374, 379, 386, 412, 423, 439, 440, 441, 448, 449, 519, 565, 567, 568, 576, 579, 582, 590, 613, 646, 647, 652, 680, 711, 814, 825, 861, 862, 863, 929, 941, 945, 947, 951, 952, 953, 956, 960, 963, 964, 965, 967, 968, 969, 970, 972, 979, 980, 981, 982, 985, 987, 989, 990, 996, 1001, 1002, 1003, 1004, 1007, 1009, 1010, 1011, 1012, 1014, 1015, 1019, 1020, 1021, 1025, 1026, 1028, 1029, 1033, 1034, 1035, 1036, 1038, 1039, 1041, 1042, 1043, 1044, 1045, 1046, 1050, 1051, 1052, 1059, 1062, 1063, 1064, 1069, 1070, 1071, 1074, 1075, 1081, 1082, 1085, 1092, 1093, 1094, 1095, 1096, 1097, 1141, 1147, 1154, 1176, 1177, 1181, 1202, 1217, 1218, 1239, 1270, 1301, 1380, 1390, 1391, 1392, 1393, 1398, 1399, 1405, 1406, 1407, 1408, 1412, 1418, 1420, 1421, 1425, 1427, 1433, 1437

**On-farm Storage**

18, 19, 32, 41, 43, 44, 45, 46, 50, 53, 58, 59, 60, 61, 63, 68, 69, 73, 90, 92, 97, 98, 101, 108, 111, 117, 125, 131, 132, 133, 138, 152, 153, 159, 164, 170, 171, 172, 173, 182, 184, 188, 191, 196, 225, 229, 233, 238, 241, 246, 249, 288, 296, 303, 311, 326, 331, 335, 344, 353, 357, 359, 367, 374, 389, 390, 391, 393, 402, 405, 459, 483, 489, 492, 501, 506, 516, 523, 560, 567, 582, 585, 587, 591, 606, 613, 623, 624, 625, 626, 634, 636, 641, 642, 646, 664, 680, 681, 685, 701, 711, 788, 794, 811, 868, 921, 923, 929, 942, 943, 944, 948, 949, 950, 958, 959, 961, 962, 976, 983, 986, 1017, 1022, 1035, 1036, 1061, 1066, 1067, 1073, 1079, 1081, 1086, 1088, 1119, 1120, 1142, 1143, 1145, 1159, 1161, 1163, 1165, 1169, 1193, 1248, 1249, 1250, 1251, 1257, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1267, 1271, 1273, 1274, 1283, 1289, 1290, 1324, 1326, 1330, 1332, 1348, 1349, 1350, 1367, 1368, 1369, 1370, 1371, 1373, 1379, 1382, 1388, 1389, 1424, 1429, 1433, 1435

**Elevators**

1, 4, 22, 25, 29, 30, 34, 35, 52, 55, 62, 64, 72, 76, 79, 80, 81, 82, 83, 85, 86, 87, 91, 93, 96, 97, 102, 103, 105, 107, 109, 110, 120, 126, 127, 137, 146, 147, 155, 156, 168, 243, 252, 288, 328, 330, 419, 420, 525, 565, 600, 605, 632, 633, 761, 808, 855, 929, 930, 931, 933, 934, 935, 936, 937, 938, 939, 954, 966, 971, 975, 978, 984, 988, 994, 995, 999, 1000, 1005, 1013, 1016, 1018, 1023, 1024, 1027, 1030, 1049, 1053, 1054, 1055, 1056, 1058, 1060, 1072, 1076, 1078, 1087, 1118, 1171, 1192, 1208, 1222, 1291, 1292, 1372, 1433, 1435, 1459

### **Commercial Storage**

1, 10, 14, 15, 17, 18, 19, 20, 21, 28, 31, 33, 39, 47, 49, 51, 66, 74, 78, 88, 92, 97, 101, 104, 107, 111, 112, 114, 115, 116, 120, 125, 137, 141, 142, 160, 183, 188, 189, 213, 229, 238, 241, 246, 250, 287, 288, 303, 332, 354, 355, 356, 419, 420, 593, 682, 921, 922, 929, 946, 948, 962, 976, 983, 1047, 1048, 1057, 1076, 1146, 1193, 1254, 1271, 1348, 1349, 1350, 1353, 1379, 1388, 1411, 1415, 1417, 1424, 1435

### **Seed Storage**

5, 157, 161, 177, 184, 197, 198, 199, 204, 208, 212, 214, 220, 223, 226, 227, 231, 232, 284, 285, 315, 317, 319, 339, 341, 358, 363, 387, 399, 401, 410, 438, 495, 597, 645, 829, 867, 956, 998, 1223

### **Grain Drying**

2, 19, 20, 24, 31, 32, 38, 42, 43, 45, 46, 48, 50, 56, 67, 70, 71, 72, 92, 101, 120, 139, 150, 158, 159, 161, 162, 163, 165, 170, 176, 178, 187, 189, 226, 293, 305, 312, 316, 320, 323, 324, 333, 337, 342, 343, 353, 416, 417, 418, 425, 426, 443, 466, 485, 486, 498, 499, 699, 880, 894, 911, 916, 920, 957, 973, 974, 985, 989, 998, 1003, 1005, 1006, 1019, 1051, 1052, 1061, 1068, 1069, 1070, 1071, 1072, 1074, 1075, 1080, 1082, 1089, 1092-1117, 1122-1135, 1144, 1147, 1148, 1152, 1153, 1155, 1156, 1158, 1162, 1166, 1172, 1183, 1187, 1188, 1189, 1196, 1197, 1198, 1201, 1202, 1204, 1205, 1206, 1207, 1211, 1212, 1213, 1216, 1226, 1228, 1234, 1235, 1236, 1239, 1240, 1241, 1242, 1243, 1244, 1245, 1247, 1259, 1276, 1280, 1281, 1285, 1286, 1287, 1295, 1296, 1297, 1310, 1352, 1368, 1371, 1374, 1377, 1378, 1382, 1383, 1395, 1400, 1401, 1403, 1416, 1428

### **Grain Transport**

10, 14, 23, 25, 35, 37, 57, 75, 77, 78, 82, 83, 84, 85, 86, 93, 94, 95, 96, 97, 98, 103, 104, 105, 106, 109, 110, 111, 113, 115, 123, 124, 137, 147, 148, 151, 168, 307, 350, 355, 356, 476, 477, 494, 571, 580, 605, 608, 609, 610, 622, 632, 633, 634, 639, 691, 733, 785, 800, 1032, 1137, 1146, 1298, 1372, 1381, 1383, 1394

### **Fumigation**

11, 12, 47, 106, 152, 237, 243, 250, 394, 402, 403, 481, 482, 483, 494, 526, 542, 563, 580, 589, 590, 591, 592, 596, 597, 608, 609, 610, 618, 625, 667, 670, 671, 675, 682, 686, 691, 692, 694, 719, 733, 738, 739, 785, 796, 797, 798, 800, 809, 823, 824, 825, 826, 828, 829, 830, 831, 834, 837, 841, 843, 844, 845, 846, 867, 955, 984

### **Grain Dust**

13, 22, 26, 54, 55, 93, 102, 140, 166, 167, 300, 318, 328, 330, 346, 347, 348, 349, 350, 362, 385, 400, 411, 427, 429, 475, 817, 927, 928, 930, 931, 932, 933, 935, 936, 937, 938, 939, 940, 966, 977, 990, 991, 992, 993, 997, 1005, 1008, 1030, 1065, 1090, 1118, 1178, 1179, 1180, 1192, 1222, 1252, 1275, 1288, 1300, 1302, 1303, 1308, 1355-1366, 1402, 1441, 1442, 1443, 1444, 1446, 1448, 1449, 1454, 1457, 1458, 1460

**Losses**

**9,164,361,384,395,801,857,903,1099**

**Grain Management**

**36,98,122,128,146,147,238,268,377,390,395,436,663,680,745,998,  
1017,1018,1089,1210,1231,1232,1233,1256,1259,1291,1292,1294,1417,  
1419,1430,1435**

**Inspection**

**7,106,134,137,256,268,325,331,352,433,504,581,762,763,934**

**Pheromones**

**16,329,457,458,523,528,557,564,570,572,586,638,659,690,700,707,  
743,744,782,859,870,871,876,877,883,884,886,887,904,905,906,907,  
908**

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